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LECTURES BY M. DE BLAINVILLE ON COMPARATIVE OSTEOLOGY.

THE

COMPARATIVE OSTEOGRAPHY

OF THE

SKELETON AND DENTAR SYSTEM

IN THE FIVE CLASSES OF

VERTEBRAL ANIMALS,

RECENT AND FOSSIL.

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WITH GRAPHIC DELINEATIONS BY M. WERNER;

EDITED (FROM THE FRENCH) AND

ADDITIONALLY ILLUSTRATED

WITH NUMEROUS NOTES, OBSERVATIONS,

AND DRAWINGS,

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THE last form of the skeleton in the Lemuridæ, is that of the Galeopitheci (*Galeopithecus Volans*, Pallas). The form of this skeleton is at first sight so abnormal, that zoologists, who claim, in a great degree, the merit of following the *natural* classification in zoology, have, after lengthened discussion, made it a genus of the Chauves-Souris (*Vespertiliones*) amongst the Secundates; and this, whilst, as I am prepared to show, there is scarcely a bone in the entire skeleton which does not indicate the structure of the Lemuridæ.

The series of mesial parts in the skeleton superiorly as a whole, is attenuated towards each extremity, as in the Makis, but with peculiarities, which are specific, and which indicate the terminating series of the Primates.

The cranium, evidently slightly curved or arched, as well in the inferior or basilar line as in the superior or coronal, is, upon the whole, of an oval form, and more depressed even than in the Galagos, and without the post-orbitar contraction. The occipital vertebra is excessively depressed, and very much widened out, in consequence of the enormous development of the mastoid processes, which extend beyond the condyles, and give a singularly lobulated appearance to the posterior aspect of the head. All the crests, occipital, temporal, and even the medio-basilar (*spina pharyngea*, H. A.), are strongly marked: the pharyngeal spine, indeed, is so well developed, that the ridge, presented by the vomer posteriorly, becomes continuous with it in such a manner, as to prolong the nasal fossæ from the palatine margin, in the form of two superficial canals, on the base of the cranium. In other respects, the pterygoid processes are still sufficiently large, and terminate by a slight bifurcation.

In respect to the jaws, the lacrymal root of the upper jaw is still half facial half orbitar, but the lacrymal canal is entirely placed within the orbit. The malar root, large, everted, does not reach the posterior orbitar process of the frontal; so that the orbit, which in all the preceding Primates, without exception, was incomplete only in its wall, is here incomplete, for the first time, in its frame or circumference: the malar bone is, however, in other respects, very large, and its inferior or dentar edge is very much everted.

The palatine root of the upper jaw is short and edged; the palatine process of the maxillary is large, arched, as also that of the inter-maxillary, (which is circular and sharp, without alveolar cavities at its inferior extremity,) in such a manner as to give the upper jaw some resemblance to that of a duck. The lower jaw has its rocky portion very small, contracted, nearly oval, the posterior aspect being much larger than the anterior, scooped out by a large and deep cerebellar sinus, and with a sufficiently large internal auditory canal.

The *ossicula auditûs* I have, unfortunately, not had it in my power to procure.

The bulla or osseous tympanum is slightly cut in upon by the carotid canal; the external auditory canal is long, although open.

The glenoid cavity is oval, transverse, and

provided posteriorly with a thick and very much bent condyloid process.

The mandibular portion of the lower jaw has its angle diverging and rounded, a very small coronoid process, slightly crotchet-shaped; the condyle is long, placed transversely as in the carnivora; the horizontal rami are narrow, with the dentar margin everted, in such a manner as to become almost flat at the extremity, the two rami forming at the symphysis a kind of semicircle. The posterior opening of the inferior dentar canal is remarkably small, sufficiently high, however, and immediately in a line with the coronoid process: the external opening of this canal is, on the other hand, pretty large, and immediately in a line with the fourth tooth.

The cervical vertebræ (seven in number) resemble those of the Makis and Indris, but their arches or laminæ are still larger. The atlas is peculiar, by reason of its great size and strength; its transverse processes resembling slightly those of the Carnivora. The axis, in respect to its spinous process, resembles also that of the Carnivora, although it is less elevated; the five remaining cervical vertebræ have their spinous processes extremely short, the transverse imbricated; the inferior lobe of the sixth vertebra being cask-shaped.

The dorsal vertebræ (thirteen in number) have their spinous processes but slightly elevated, though large, contracted, and slightly inclined backwards, with the exception of the two or three last, which are very nearly vertical.

The lumbar vertebræ (six in number) have the last vertebræ diminished in size, and comprised entirely between the ischiatic bones; their spinous processes are large, short, nearly vertical, resembling those of the Indris; the transverse processes are broad and short.

The sacrum is composed of five vertebræ, whose bodies and articular processes are united by bony union; the third or middle vertebra is narrower than the terminal ones. The first alone enters into the composition of the sacro-iliac articulation; an arrangement which we have already remarked in the Galago.

The tail, of medium strength, but elongated, is composed of sixteen vertebræ: the first three of which are short and broad; the others assuming gradually the usual form, and becoming slender to the termination.

Of the inferior mesial parts, the body of the hyoid is short, sternebroid, compressed, supporting two styloid horns of medium size, consisting of two portions only, as in the Galagos, and two laryngeal horns resembling the body of the hyoid, but more elongated.

The sternum is still shorter than in any other species of the group, six sternebræ only enter into its composition; the central four being large and flat, increasing from before backwards. The manubrium is large, and presents anteriorly a truncated pointed process; the xiphoid process is of medium size.

The ribs (thirteen in number), seven sternal and six asternal, as in the Makis; they are, however, peculiar, the three first being rather narrow, the six others are so flat and large

Fig. 48.

Galeopithèque Volant (*Galeopithecus Volans*, Linn.).
Galeopithèque roux, *Galeopithecus rufus*, Desm.
Lemur Volans, Linn.
Habitat, the islands of Pelew, where it receives the name of Oleck.
Skeleton entire, viewed in profile. After a skeleton recently added to the collection, and exchanged with the Faculty of Sciences, but finally prepared and set up in its proper position under my own inspection, being guided at the same time by a specimen of the animal not dissected and preserved in alcohol.

as nearly to touch each other at their spinal extremities; the sternal cartilaginous appendages are, on the contrary, narrow and compressed.

The limbs of the Galeopitheci retain the proportions of those of the Makis, being, however, still proportionally longer and more slender.

The scapula, a little larger than in the Makis, resembles that of the Loris. The extremity of the acromion process is rounded, but from its anterior margin arises a bifurcation, which is in connection with the clavicle; the coracoid process gives off from its descending part a process which also touches the clavicle. The clavicle is of sufficient length, but very slender.

The humerus is also of sufficient length, being nearly equal to the thirteen dorsal vertebræ; its internal condyle is perforated, and it resembles, indeed, in all respects, that of the Lori Paresseux (*L. Tardigradus*, Linn.).

The two bones of the forearm are much longer and more delicate, being a fifth longer than the humerus; in fact, the radius (quite straight) equals in length the first sixteen vertebræ (seven cervical and nine dorsal). The ulna shorter, its distal extremity having the form of a thread without reaching the carpus, so that the radio-cubital articular surface of the humerus has the form of a double unequal pulley, being nearly entirely occupied with the enlarged head of the radius, whose distal extremity, which is perhaps even larger than the proximal, engrosses all the carpal articulation.

The hand resembles also that of the Makis, although more quadrupedal, in consequence of the compressed form of all the phalanges, and especially of the distal ones.

The carpus is, indeed, very short. The semilunar bone, together with the ninth or intermediate one, appears to have completely disappeared; the scaphoid, cuneiform, and pisiform articulating directly with the radius. The trapezium, trapezoides, magnum, and unciform are all present. The trapezium is still larger than the trapezoides, and even exceeds the os magnum, which, indeed, is here the smallest of the four.

Of the fingers, the first or thumb, is still the strongest, although, at the same time, the shortest; of the other four fingers, it is the metacarpal bone of the fourth, or ring finger, which is the longest; in respect to the phalanges, those of the little finger seem rather the longest and strongest, at all events, it is not the middle finger. A specific character of those animals is, that the second (*middle*) phalanges are longer than the first (*proximal*), and the distal phalanges are extremely thin, elevated, slightly arched, and pointed at their extremities.

The posterior (pelvic) limbs resemble, still more than the anterior, those of the Lori Grele. In respect to the pelvis the resemblance is so great, that, although twice the length, one might very readily mistake the one for the other, only the sacro-iliac articulation is placed a little more posteriorly in the Galeopitheci than in the Loris; the pubic margin is also more oblique than in the Loris, in whom it is also more prominent; in other respects the iliac bones are delicate and narrow, the symphysis pubis extremely narrow; the posterior angle of the ischium is very large, having altogether the greatest similarity to the Loris.

The femur (evidently longer than the humerus, since it equals in length the seven cervical and first seven dorsal vertebræ) has positively the same form as in the Lori; its third trochanter is only a little more marked.

The resemblance to the Loris is still perfect in the two bones of the leg; they are, perhaps, a little longer in the Galeopitheci, since they equal the femur in length; the fibula is still more slender, particularly its proximal extremity.

The foot, as a whole, on the contrary, is a little shorter, and the ankle-joint is, especially, more locked. The tarsal bones are short, the elevated pulley of the astragalus is well inclosed between the malleoli; the calcaneoid tuberosity resembles that of the Makis, only a little shorter; the scaphoid, of its usual form, is extremely inter-osseous (*concealed by the neighbouring bones*), in consequence of the large sesamoid bone which occupies all its internal margin. The first cuneiform is still the largest of the three cuneiform bones, the digital articular surface being vertical and rounded; the toes closely resemble the fingers; for instance, the first (*great toe*) is the most massive and shortest, and the fifth (*little toe*) is the longest, and nearly as massive as the first; nevertheless, it is the fourth metatarsal bone which is the longest; the fifth metatarsal bone is remarkable for the large, external, heel-shaped projection at its proximal end. The phalanges of the toes resemble, in their proportions, &c., those of the hand, only, that upon the whole they are a little shorter, the proximal and middle phalanges being less unequal.

I strongly suspect that some differences may be found in the skeletons of the two species of Galeopitheci, whose stuffed skins are in our collection, but, unfortunately, I have only seen the head and dentar system. That is certain with regard to the Galeopithecus a *Grande Queue* (*large-tailed Galeopithecus* of M. Temminck) although we are familiar only with the trunk and limbs. In truth, that new species has only three sacral vertebræ and twenty-one coccygeal, instead of sixteen or seventeen coccygeal at the most, which we find in the Galeopithecus Volans; there are the same number of ribs, although they are not so large; the scapula is larger, however, more rounded; the humerus not so long proportionally, and particularly so with regard to the bones of the forearm, the

ulna being much more perfect and larger; the fingers, also, are longer; lastly, the fibula, like the ulna, is more developed, indicating a less anomalous species, one more nearly allied to the Makis.

OF THE SESAMOID BONES (*Bones of the Tendons*).

These small bones in the Maki Vari, which I have selected as a type in this great Linnæan family, appear to me not so numerous as in the other Primates.

In fact, in the anterior (*thoracic*) limbs, I (like Daubenton) have only found those belonging to the long abductor of the thumb, and those, which are very minute, occupying the flexor aspect of the metacarpo-phalangeal articulation of each finger.

In the posterior (pelvian) limbs, we find a long and narrow rotula, much more so than that of the Cebidæ, or American Monkeys; the small pisiform bones in the tendons of the gastrocnemii muscles at the back of the knee-joint, one in the tendon of the popliteus muscle, and a fifth, placed inside the external lateral ligaments, and which appears to be attached to the semilunar cartilage.

In respect to the sesamoid bones of the foot, I have not met with them in the tarsus, nor even under the cuboid. But those at the tarso-phalangeal articulation, and especially of the great toe, which also presented very small ones between the first and second phalanx, are very distinct.

We have already alluded to the large, square-formed, flattened sesamoid, intimately applied to the internal margin of the scaphoid in the Galeopithecus Volant.

OF THE TEETH.

The teeth in the Lemurs want that fixed uniformity of number, of form, and even of arrangement, which we have remarked to exist in the two preceding groups, viz., the Simiadæ and Cebidæ, in which, in truth, the true characters never presented the slightest difficulties.

In the Lemurs, however, this is by no means the case, since Erxleben admits six incisives in each jaw instead of four, three canine teeth on each side of each jaw, and, moreover, a small number of molar teeth, which he has not defined.

Modern zoologists, in the mean time, nearly agree with Shreber and Gmelin, in giving to the Lemurs, two pairs or four incisives in the upper jaw, three pairs or six in the lower jaw, one pair of canines in each jaw, six pairs of molars in the upper, and five pairs in the lower jaw; M. E. Geoffroy's system of dentition being four incisives both in the upper and lower jaw, two canines and six molars in each jaw. Let us examine into this.

In the Maki Vari (*Lemur Macoco*, Linn.), which we have taken throughout as our type, the total number of teeth,* as well in the upper as in the lower jaw, is the same as in the Sapajous (Cebidæ), that is to say, there are nine, and in the upper jaw they are also similar to those in both classes, viz., two incisives, one canine and six molars, of which three are anterior molars, one principal and two posterior molars. The form, and especially the relative proportions, retain a certain analogy, but they differ in arrangement, there being a considerable interval between the canines and first molars, whilst there exists no interval between the canines and second incisives. This change in the arrangement of the teeth in the upper jaw, holds in respect to the nine teeth in the lower jaw, which have an anomalous form and arrangement, and to which we have seen a slight approach in the Ouistiti. In fact, as to the first of the inferior molars, which we recognise as such owing to their crossing anteriorly the first superior molars, and approaching the canine in form, it happens that in order to lodge these teeth there was required a vacancy above, behind, and partly within the canine; hence the real inferior canine must be the external tooth of those lying inclined in the form of a comb, and of these the two smallest are incisives.†

The dentar formula of the Makis properly so called, will, consequently, stand thus:—

	Upper Jaw.	Lower Jaw.
Incisors ..	4	6
Canine ..	2	2
Molars ..	12	10
		18
		18
Total		36

Let us now proceed to the particular description of these teeth.

In the upper jaw the incisive teeth are extremely small, vertical, similar to each other, slightly forceps-shaped when they are entire, and altogether lateral with regard to the jaws; the two first separated mesially by a considerable interspace.

* It is rather difficult to explain how Buffon and Daubenton are not agreed as to the total number of the teeth of the Macoco, Buffon making them 36, and Daubenton 38; and how Vicq. D'Azyr seems disposed to ascribe the error to Buffon, who was merely in error in printing the five molars in the upper instead of in the lower jaw, whilst the real error appertained to Daubenton, who asserts positively that the Macoco has six incisives and one canine *below*, and six molars on each side of either jaw.

† Although the artist has not given a representation of the teeth of the Maki Vari, we find a system of dentition much resembling it in that of the Lemur Ruber (*Maki Roux*, Cuvier.

The canine teeth are, on the contrary, very long, arched, pointed, compressed, cutting on both margins, more especially the posterior. The three anterior molars, which follow in succession after a well-marked interval, have their base three-sided; the longest side externally being prolonged into a pointed angular lobe, cutting; the opposite angle of the tooth is in the form of a tubercle, extremely small in the first tooth, but more developed in the second, which is the more elevated of the three; very large, and still more tubercular, in the third. The principal molar which follows *en suite* is, in fact, the largest of the molars by the great length of its tubercle, which renders it almost square, but it is very low, although a little less so than the two posterior molars; as in these, its external side is divided into two pointed denticles, equal in the *principal* molar, unequal in the molars immediately following, and very unequal in the second back molar, which is likewise much smaller than the first.

In the lower jaw the two (three?) pairs of incisors are equal, close, very much compressed, pointed, very little arched, sloping, and almost in the axis of the jaw. The canines do not differ from the incisives, with which they form a continuous series, equally sloping, at the same time they are a little stronger, irregularly three-sided and pointed at their coronal surface. The three *anterior* molars are but slightly apart, and their corona, more or less thickened, is formed by a point anteriorly, tending to become more and more median, very much elevated in the first tooth, giving it the appearance of a canine, and of a posterior tubercle more developed in the third tooth. The *principal* molar is, as in the upper jaw, the strongest of the three, and, like the others, narrow, depressed, and formed of two unequal lobes, evidently much smaller than the preceding, even in the posterior tooth. The cutting or carnivorous lobes are altogether external, and very much crossed, or rather overlapped, by those still more developed lobes of the superior molars. In consequence of this, in the molar region of the dentar system of the Maki Vari, the carnivorous part is much more developed than in the Sapajous (Cebidæ), or American Monkeys.

The other species of the true Makis present in their dentar system only specific varieties, bearing chiefly on the proportional difference between one tooth and another: this is, at all events, the case in the *Maki a front blanc*, and Lemur Ruber; but it is not precisely the same in the L. Murinus (*Galago de Madagascar*, Desm. Geoff. *Rat of Madagascar*, Buff.) and especially in the L. Milii (*Maki de Milius*) in which species the head sometimes resembles the Galagos: in truth, the canines in the upper jaw are more conical, and less compressed; the *anterior* molars are less cutting (carnivorous), less sloping, anteriorly; and the *principal* and *posterior* molars have the internal margin of the corona almost as much elevated as the external, but the incisives are unequal and very small. On the other hand, in the L. Furcifer (*Maki a Fourche*) closely allied to the genus Cheirogale of M. Geoffroy, the first pair of incisors, evidently stronger than the external, converge extremely, whilst the incisive-shaped canine in the lower jaw scarcely exceed in strength the true incisives; as a recompense for this, the inferior and superior false canines (first *anterior* molars) are of considerable length, and more lance-shaped than in the other Makis, in which it is the second *anterior* molar, which is the longest or most elevated.

In the Lemurs, ascending in the scale,

Fig. 49.

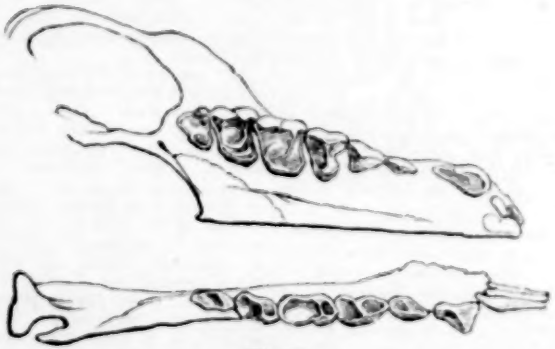

Fig. 50.

Fig. 49. Upper jaw, right side; dentar aspect.
Fig. 50. Lower jaw, right side; dentar aspect.

we find that all the superior species have invariably the same number of teeth as the Makis; in the Galagos they resemble, in every respect, the higher species of the Makis; but differ very distinctly in the Tarsiers, where the teeth present much more of an insectivorous character, and resemble those of the Ouistiti; all their tubercles being much more elevated, more conical and pointed. Besides, in the upper jaw the first pair of incisors is terminal, and much longer than the external pair, exceeding even the canines in length; in the lower jaw, the external pair of incisives is in fact alone present, the canines resume their usual characters of being conical, curved, more elevated upon the whole and crossing anteriorly, than in the upper jaw. The three *anterior* molars are cone-shaped, and increase a little from the first to the last; the *principal* and *posterior* molars become decidedly more insectivorous by the elevation and tricuspid form of the corona of the anterior tubercle (*lobe*). The last molar of the series, is, on the other hand, the largest, and its posterior lobe is in like manner tricuspid.

The Loris may be included almost altogether within the same typical form, in the point of view we are now discussing. In one species only, the Lori Grele (*L. Gracilis*, Desm. Geoff., *Loris Tardigradus*,) the teeth partake more of the insectivorous character, especially those of the lower jaw as in the Tarsiers (*L. Spectrum*, Geoff. Pallas; *Woolly Gerboa*, Penn.) and the Paresseux (*L. Tardigradus*, Linn.; *Nycticebe da Bengale*, Desm.). The resemblance to the Galagos is much more striking, at least with regard to the molars, for in this species the first internal incisor of the upper jaw is evidently stronger than the external, as in the genus Tarsier.

In the descending scale the Lemurs present much more numerous anomalies in their dentar system, than those in the ascending scale; and in general they appear to want the canines, particularly if we observe *form* alone. Take, for instance, the genus Indri. (*L. Indri*, Linn.) In that family of the Lemurs, the total number of teeth is diminished, as well in the upper as in the lower jaw, since there are only eight in the one and seven (on each side) in the other, so that the formula stands thus:—

	Upper Jaw.	Lower Jaw.
Incisors	4	2
Canines	2	2
Molars	10	10
		—
		14
		16
		—
	Total	30

In the upper jaw the incisives appear arranged in the form of an oval palette, and are much stronger than in the genus Makis: the anterior are a little stronger than the posterior. The canines, still sufficiently distinct, are triquetral, straight, compressed, but much less so, and particularly much shorter, than in the typical Maki: there are only two anterior molars, viz., the second and third of the Maki Vari, more resembling each other, and considerably less carnivorous. The *principal* and first *posterior* molar nearly equal in size, are less cuboid than in the typical Maki, and their corona has the four lobes characteristic of the Simiæ. Finally, the last molar, which has its corona triangular, has its posterior lobe very massive.

In the lower jaw the differences are still greater than in the upper. In the first place I admit only one pair of incisives, properly so called; the external of the sloping group being evidently analogous to the incisive-shaped canine tooth of the Makis; it is even stronger than in the Makis. The five succeeding teeth correspond precisely to the five superior molars, crossing each other regularly.

The two *anterior* molars are very nearly similar in the upper jaw, unless perhaps in being more compressed and more cutting (*carnivorous*). The *principal* molar, the strongest of the three last molars, has four lobes like those which follow; but the two anterior are very oblique, so much so that the internal lobe is opposite the groove which separates the two external lobes, whilst in the first *posterior* molar they form two transverse ridges. Finally, the last molar, almost as long as the *principal*, has a heel behind the posterior elevation, thus giving to it a fifth lobe, which makes five lobes on the corona.

If we now continue the comparison in the other species, we find that the Indri a Queue (*Indri a Bourre; Lich. Laniger*, Gmel.) differs from the type, only in the superior incisors resembling those of the true Makis.

The species which constitutes Mr. Bennett's genus Propithecus (*Propithecus a diademe; Lich. diademe*, Linn.) presents, in all probability, considerable differences, if we may judge from the examination of the head of a young specimen which I have seen; in fact, the incisive teeth in the upper jaw are much stronger than in any other species of the Makis with which I am acquainted; and the two first, particularly, are triquetral, arched and converging, so as to remind us of those in the Aye-Aye, whose dentar system presents anomalies the most remarkable. Of the permanenth teeth, or adult dentar system, I have only seen the *principal* molars as they are appearing above the alveoli, and these seem to me perfectly similar to the *principal* molars of the Indri.

COURSE OF LECTURES
ON THE
PHYSIOLOGY AND PATHOLOGY OF THE BLOOD,
AND
THE OTHER ANIMAL FLUIDS,
DELIVERED IN THE SESSION OF 1839-40,
AT THE
School of Anatomy adjoining St. George's Hospital.

By HENRY ANCELL, Esq., Surgeon.

Lecture XVII.—(*Continued.*)

35. *Upas Antiar, &c.*—A substance which arrests the heart's action. Seven to fourteen seconds elapses between the introduction of these substances into the veins (vide 29), and their effect upon the organ. This interval is expended in reaching the extremities of the coronary arteries, and circulating over the parietes of the heart. A substance which has a special power of arresting the circulation in the capillaries (42), pushed with force into the aorta from the axillary artery, affects the whole capillary system in from 4 to 7 seconds. Hence, a substance received into the veins may be distributed to the capillaries of the whole system in 5 (vide 23) + 4 = 9 seconds. A substance which, when mixed with the blood, both retards the capillary circulation and arrests the action of the heart, being thrown into the *aorta*, requires 35 to 45 seconds to traverse the whole circulation, come back again to the aorta, and proceed thence through the coronary arteries to the parietes, so as to paralyse the heart. But substances which thus act upon the heart, also impede the progress of the blood through the capillaries from 15 to 25 seconds. Hence the time required for a substance, which has no special action on the capillaries to pass from any part of the vascular system back to the same point again, varies from 12 to 20 seconds.—*Blake.* In perfect accordance with Hering's results, who found in horses that the whole round of the circulation is completed in about 25 seconds.

36. *Strychnia.*—A grain in a small quantity of acetic acid into the jugular of a dog. The first effect—general convulsions in about 30 seconds; heart at the same time rendered irregular by the struggles of the animal; external signs of life ceased in about 1½ minute, the heart continuing to beat; after apparent death the pressure in the arterial system about equal for a minute to what it was before death. P.M. A quarter of an hour after death the right side of heart contracted on exposure to the air; contained dark blood; left ventricle contained a small quantity of blood equally dark. Produces death by an action on the nervous system. Small quantities do not appear to exert the least influence on the heart.—*Blake.*

37. *Nux Vomica.*—The lower end of the divided carotid of one dog was connected with the upper part of the divided carotid of another. Nux vomica then introduced into the back of the former, by which the animal was poisoned. The latter, to whose brain the blood of the poisoned animal was thus directly conveyed, remained unaffected. A sure proof that it is not the poisoned *blood* which produces the effect on the system, and that poisons act through "the sentient extremities of the nerves."—*Addison* and *Morgan.* By an investigation with the hæmadynamometer it appears that the only effect of the arrangement made was to cause a reflux of pure blood from the arteries of the sound dog into those of the poisoned one; hence a negative result.—*James Blake.* Injected into the blood produced tetanus. Death in a few minutes from a certain quantity, but no perceptible alteration found in any of the solid parts. From a moderate quantity the tetanus was in a certain degree *intermittent*; it appeared and disappeared alternately for some time. Produced all its effects when the medulla spinalis was cut across, from which it is inferred that the poisoned blood circulating in the muscles excites their contraction. If the abdominal aorta be tied above its bifurcation, after dividing or without dividing the medulla spinalis, the poison does not act on the lower extremities, although its effects on the upper are nearly instantaneous. If the venous circulation be suspended after it is inserted into one of the lower extremities, it will not exert any influence local or general. When inserted into the crural artery, the limb is instantly contracted, and soon afterwards the tetanus becomes general, whether the medulla spinalis has been divided or not. The poison acts on the system, not through the nervous centres or cords, but through the circulating blood; which fluid is first altered in its properties, and then acts upon the organised parts, particularly the nerves. Should not the tetanic phenomena be considered as symptoms of a disease of the blood?—*Segalas.*

38. *Woorara.*—Introduced into the jugular, twenty seconds elapsed before any symptoms of its action; then violent convulsions, and death in about 25 seconds more. Introduced into the ascending aorta, symptoms occurred in 7 seconds, and death in about 23 afterwards; thus having to traverse a shorter space before it reached the nervous centres; its effects occurred some seconds earlier.—*Blake.* The same observation would apply supposing it to act in the

periphery. This poison, made to circulate with blood throughout the abdominal viscera, the vessels going to the liver having been previously tied, produced no effect for 7 minutes, and death did not occur for 15; even then it was probable that the effects resulted from its having escaped into the abdomen and being reabsorbed.—*Blake.*

39. *Hydrocyanic Acid.*—Action on the nervous system, analogous to that of strychnine; but it also appears to exert a decided effect on the heart, not by destroying its property of contracting, but by rendering its contractions irregular, and causing variations of pressure in the arterial system. A sufficient interval always elapsed between the application of the acid, and the moment when its first effect was produced, to allow of its being brought into contact with those tissues on which it appears to act. The portal vessels being tied, 3vij. of Scheele's acid was introduced into the stomach, on the "sentient extremities" of the nerves of which the poison is said to act. Ten minutes elapsed without the slightest effect; the ligature was removed, and one minute afterwards the effects of the poison manifested themselves.—*Blake.* Sometimes makes the blood oily, fluid, and bluish in colour; frequently of a cochineal colour; the odour of the acid sometimes observed in the blood.—*Christison.*

40. *Carbazotic Acid.*—A watery solution of 10 grains injected into the jugular of a fox killed it instantly, and 5 grains affected a dog in 3 minutes, and killed it in 24 hours. Its symptoms in the fox; tremors, grinding of teeth, contortions of eyes, convulsions, insensibility, and death. P.M. No particular alteration of structure. Irritability of voluntary muscles remained; stomach, conjunctiva, aqueous humour, capsule of the lens, membranes of the arteries, veins, lungs, and in many places the cellular tissue, sometimes the urine, and the fibrin of the blood dyed of a lemon yellow colour. In no instance any yellow tint in the brain or spinal cord.—*Rapp* quoted by *Christison.*

41. *Conia.*—Action analogous to strychnia; death produced in a shorter time than by any other substance; 15 seconds always elapsed before any symptom of its action. Respiration violently affected or stopped, convulsions and death 30 seconds after its introduction into the femoral vein.—*Blake.*

42. *Tobacco.*—An infusion of 10 grains, injected into the jugular of a dog, besides acting upon the heart, so as to stop it suddenly, and occasioning laborious respiration, produced a remarkable increase of pressure in the arterial system. It is totally impossible to account for this increase of pressure by the change in the action of the heart, and, therefore, it must depend on some change in the action of the capillary vessels. It may thus be inferred, that this and many other substances circulated with the blood throughout the capillary system, has a powerful effect on the elasticity of the capillary vessels; this change of pressure takes place before the heart is affected.—*Blake.*

43. *Euphorbium.*—Solution of, injected into the veins, has a powerful action on the capillary vessels.—*Idem.*

44. *Digitalis.*—Exerts a decided action on the heart by rendering its pulsations slower, and also, like tobacco and euphorbium, modifies the capillary circulation.—*Idem.*

45. *Colchicum.*—Thirty drops of vinous infusion, with a drachm of water, into the jugular of a dog. Tremor, fluttering pulse, nausea, but no retching, pulse then intermitting, recovery in 7 hours.—*Exp.* 2. 160 drops of the same infusion; instantly lost all power of voluntary motion; breathing at first extremely slow, then ranging at 40, 30, 54; pulse hardly to be felt, ranging at 84, 60, 115, 150, tremor of hind legs. In an hour violent tremor, and inspirations could not be counted; at first ineffectual efforts to vomit, then vomiting of mucus tinged with bile, languor, voided urine, three liquid stools: pulse too weak to be counted; in four hours extreme languor, in five hours vomited bloody mucus, and expired. P.M. Stomach contained mucus tinged with blood, inflamed; internal surface of duodenum universally inflamed, jejunum and ileum less so, colon more so than the ileum.—*Sir E. Home.*

46. *Cantharides.*—One drachm and a half of a strong oleaginous solution into the jugular of a dog. Killed it in four hours with symptoms of violent tetanus.—*Orfila.* Renders the pulsation of the heart slower, and diminishes the pressure in the arteries.—*Blake.* Two drachms produced copious diuresis and erosion of the bladder in two experiments.—*Haller.* P.M. Great redness of the tubular part of the kidneys, redness and extravasated patches on the inside of bladder, ureters, and urethra.—*Schubarth.*

47. *Opium.*—Infusion injected into the jugular, being soon circulated in the brain, stupified, but did not kill.—*Dr. C. Wren.* Brought on drowsiness.—*J. Hunter.* In an hysterical girl, affected with the most violent tetanic symptoms, threatening life, an ounce of laudanum received into the stomach having produced no effect, a drachm of strong solution of opium was injected into the basilic vein every five minutes. The symptoms all gave way under the immediate effects of the remedy, and the patient recovered.—*Coindet.*

48. *Morphia.*—Acts on the heart by rendering its pulsations slower, the pressure on the arterial system becoming diminished. Ten grains of the acetate produced this effect in a dog.—*Blake.*

49. *Narcotine.*—Injected into the veins of dogs:—always followed by convulsions and

tetanus, with dilatation of pupil, quick pulse, &c.; but if the dose were small, say half a grain or a grain, it did not always destroy. Half a grain killed cats in five minutes, and there was invariably congestion within the head and extravasation on the cerebellum.—*Dieffenbach.*

50. *Verdigris.*—One or two grains injected into the veins produced vomiting and discharge of fæces, violent convulsions, insensibility, and death, seldom later than ten minutes. P.M. Nothing particular except loss of contractility in the voluntary muscles.—*Orfila.* The metal detected by incinerating the liver of animals poisoned by the salts of copper, and in no other part of the body, which tends to prove that poisons introduced into the blood accumulate in particular organs.—*Dr. Wibmer* quoted by *Dr. Christison.*

51. *Hydrochlorate of Tin.*—Half a grain injected into the venous blood destroyed a dog in twelve hours, the only symptoms being somnolency and catalepsy, or fixedness of position. Tetanus and more rapid death from larger quantities.—*Orfila.*

52. *Nitrate of Silver.*—Tetanus and death in 4½ hours from one-third of a grain. Blood in the heart very black; lungs gorged or vivid red.—*Orfila.* The readiness with which this and many other salts are decomposed, prevents their entrance and accumulation in the blood in sufficient quantity to develop their general effects.

53. *Sulphate of Manganese.*—Twelve grains injected, occasioned death in five days. The stomach, duodenum, and liver much inflamed.—*Gmelin.*

54. *Acetate of Lead.*—Thirteen grains killed a dog almost instantly, the only symptoms being convulsive respiration. Five grains destroyed in five days; the leading symptoms weariness, languor, staggering, slight convulsions. Sometimes violent dysentery during life, stomach corrugated and red, and small intestines vascular. P.M. Blood sometimes fluid, and of a vermilion colour in the veins, and brighter than usual in the arteries.—*Orfila, Campbell, Gaspard.*

55. *Hydrochlorate of Baryles.*—Death, preceded by convulsions, at first partial and then general. When it took place, with great rapidity, the alimentary canal healthy; when more slowly, the mucous membrane of stomach of a deep red colour.—*Orfila.*

56. *Bichloride of Mercury.*—One drachm killed a horse.—*Dupuy.* One drachm of concentrated solution injected into the jugular of a dog:—violent efforts to vomit; death in the course of the day. Acts by coagulating the albumen of blood, but some time is required for this to take place. P.M. Tissue of the lungs dense; gorged with black blood; their elasticity diminished. Right cavities of the heart distended with fibrinous clots; left cavities collapsed and nearly empty. No appreciable alteration in the alimentary canal. Attributes the latter circumstance to digestion being in progress at the time.—*Magendie.* Vomiting, bloody diarrhœa, dyspnœa, apparent pain in the chest, bloody sputa, death in a few seconds, or in three or four days, according to the dose, which varied from one to five grains. P.M. Redness of mucous membrane of intestines; lungs, according to the length of time the animal survived, had black ecchymosed spots, or black tubercular masses, some inflamed, others gangrenous, others suppurated, or regular abscesses separated from one another by healthy pulmonary tissue. Sometimes salivation.—*Gaspard.* A grain of corrosive sublimate is sufficient to destroy a dog computed to contain six pounds of blood; supposing the mineral to be equally diffused, and the whole of it to remain in the blood, the analyst has to search for a minute particle in more than 50,000 parts of blood. The latter experiments also exemplify the *infinitessimal* quantities of active agents, which are capable through the blood of producing the most multifarious and fatal effects.

57. *Purgatives.*—About two drachms of a purgative liquor injected into the median vein of a lusty soldier dangerously affected with syphilis; four hours afterwards it began to operate, and did so the next day, giving five stools. A laxative substance, injected in the same manner into the blood of a married woman, and into that of a maid of 20, affected with epileptic fits from birth; the first had gentle stools, the second had four stools, all three vomited violently soon after the injection; "all cured."—*Fabricius.*

58. *Scammony.*—In solution, injected into the veins produced vomiting and death.—*Becket* quoted by *Haller.*

59. *Senna.*—Infusion of, two drachms occasioned vomiting.—*Haller.*

60. *Jalap.*—In the form of infusion injected into the jugular. Vomiting and purging.—*Hunter.*

61. *Rhubarb.*—Infusion of. A profuse flow of urine.—*J. Hunter.*

In Mr. Hunter's experiments the effects ceased in a few hours, and appeared to have in no respect injured the animal's health.

62. *Castor Oil.*—An American physician injected a small quantity of castor oil into his blood. Nausea, taste of oil in the fauces, indescribable sensation ascending towards the head, faintness, spasm of the jaws, imperfect articulation, griping, with tenesmus, ensued; did not recover his health for several weeks.—Quoted by *Mayo.*

63. *Ipecacuanha.*—Infusion of, injected into the jugular, occasioned vomiting. Many medicines received into the blood are followed immediately by the same effects, which more slowly result from their being taken by the mouth.—*J. Hunter.*

64. *Tartarised Antimony.*—Six or eight grains dissolved in water and injected into

the veins of a dog, occasion vomiting, and purging, and death within an hour. A small quantity traverses the pulmonary organs for a time without any effect, but there is soon dyspnœa, cough, suffocation,—the heart's action becomes frequent, and death results. P.M. The whole lining membrane of the alimentary canal red; lungs orange-red or violet throughout, not crepitant, gorged, dense, like the spleen, here and there even hepatised; a larger quantity was followed by a fatal result more rapidly, without affecting the alimentary canal; a smaller quantity by intense inflammation, and then death in twenty-four hours. Produces death by a general inflammatory state of the whole system, the gastro-enteritis and pneumonia being only parts thereof.—*Magendie*. Four grains of emetic tartar injected into the median vein of a young woman labouring under tetanic symptoms, threatening the immediate extinction of life, from worms, produced vomiting in twenty minutes, numerous lumbrici were ejected, and the patient recovered.—*Dr. Meplain Journ. Compl. Knapf* called to a man in whose œsophagus a piece of beef had stuck, excited vomiting, and the ejection of the foreign substance, by injecting four grains of emetic tartar dissolved in an ounce of warm water. *Dr. Aggeus* records a case of impending suffocation cured by injecting this substance into the veins. Gangrene of the limb was in this instance threatened, but the patient recovered. There are, I believe, other cases on record.

65. *Ergot.*—One ounce and a half of concentrated decoction into the jugular of a dog; soon afterwards loss of appetite, general uneasiness, plaintive cries, debilitated walk, evident dragging of the posterior extremities, then painful vomiting. Some hours afterwards dyspnœa, febrile pulse. Had scarcely recovered the next day, when a fresh injection was followed by pulmonary embarrassment, stertorous dyspnœa, frequent pulse, loss of power of walking and standing, stupor, interrupted by cries and painful struggles, continual suffering for nine hours, then bilious vomiting, lastly hiccough and death, thirty hours after the first injection. P.M. Lungs studded with small, round, black patches, not hard to the touch, and gangrenous inflammation; two black patches in mucous membrane of stomach; muscles browner and of a deeper colour than ordinary; brain violet, livid, and firm; other organs healthy.—*Gaspard*.

66. *Saliva.*—One ounce into the jugular of a large dog; soon followed by evacuation of urine, and then of fæcal matters, then vomiting, and ultimately depression, inertia, dyspnœa, and slight fever; but after three hours, return of appetite, and perfectly well the next day.—*Gaspard*.

67. *Bile.*—Half an ounce from a calf into the jugular of a dog; some minutes afterwards an abundant secretion of clear urine, then two liquid alvine dejections. No further disturbance of function, not even loss of appetite.—*Gaspard*. A nearly similar result obtained by *Deidier* and *Bichat*. Bile of persons suffering from the plague of Marseilles injected into the veins of dogs constantly killed them. That from malignant fever made them ill, without being fatal.—*Deidier*.

68. *Urine.*—One ounce and a half of human urine into the jugular of a very large dog. At first only general uneasiness, without any excretion, and even quick return of appetite. Three hours afterwards an abundant alvine evacuation, and in half an hour another, more copious, and, at the same time, an enormous discharge of urine, after which complete recovery.—*Gaspard*.

69. *Whey.*—One ounce and a half from the milk of a cow, filtered, slightly acid. Except at the expiration of some hours an evacuation of urine, there was no disturbance of function, and the animal did not even lose its appetite.—*Gaspard*.

70. *Milk.*—Six drachms produced no appreciable effect.—*Gaspard*.

Lower and others had fatal results from injecting 1 lb. or 1½lb.

71. *Soup.*—Two ounces of beef and vegetable soup, as served at table (it is to be presumed filtered and thin), into the vein of a dog. Accelerated respiration, frequent dry cough, which lasted a quarter of an hour, the only effects. No subsequent lesion. No disturbance of the secretions.—*Gaspard*.

72. *Serum* of human blood into the veins of a dog. Retraction of the limbs and derangement of the cerebral functions; 10 ounces in another experiment produced purulent effusion into the joints and albuminous urine; 10 ounces of the serum of one dog into the veins of another occasioned acute pains, as of rheumatism; pulse 150, intactile; death in 48 hours. P.M. Blood evidently altered in its properties; its fluidity so remarkable, that on opening a vein in the neck, and hanging up the animal by the hind paws, the greatest part drained away, and the remainder contained only a few imperfectly-formed clots, occasioned, perhaps, by the alkaline characters of the serum; cephalo-rachidian fluid, reddish, and formed into a sort of coagulum.—*Magendie*.

73. *Abdominal Serosity.*—Half an ounce from a dropsical cat with a scirrhous liver into the veins of a dog. Rapidly followed by gulping, soon afterwards an abundant flow of urine, which was repeated; refusal of aliments, stupor, intoxication, dyspnœa, feeble pulse; after ¼ of an hour alvine dejections, at first hard and then liquid; after that, return of appetite, and complete recovery in an hour.—*Gaspard*.

74. *Chloride of Sodium and Carbonate of Soda.*—A dilute solution of in water, injected in large quantities into the veins of

patients labouring under cholera, in a few cases, with the most happy results—individuals at the point of death restored to life and health.—*Dr. Latta. Mr. Girdwood, &c.* LANCET. 1832.

75. *Recent Pus.*—Three drachms into the jugular of a scorbutic dog. In 3 minutes abundant urine, then reiterated vomiting, and attempts to evacuate the bowels, then stiffness and emprosthotonos, followed by renewed vomiting; very fœtid stools, which relieved the animal; afterwards harassing tenesmus; death in five hours. P.M. Intestines thickened; rectum and colon especially much inflamed.—*Gaspard.* One drachm made the animal from the first very ill, but he ultimately recovered.—*Magendie.*

76. *Fœtid Pus.*—Two drachms from a large ordinary ulcer into the jugular of a dog; instant agitation, gulping, then great prostration, moaning, repeated vomiting during the day; towards evening, respiration scarcely perceptible; pulse feeble; paws extended; 10 hours after the operation blackish liquid, extremely fœtid motions, which gave immediate relief; complete recovery on the following day. Three drachms of the same pus occasioned similar symptoms, and death in 24 hours, preceded by frequent whitish, very fœtid, stools. P.M. No appreciable change of structure. These experiments reiterated on greyhounds; the first caused fever, vomiting, great prostration, and diarrhœa, which relieved the malady; the second killed, as in the former instance. P.M. Lungs inflamed, and nearly hepatised; half an ounce in another instance was followed at first with violent vomiting, then frightful nervous symptoms, exalted sensibility, irregular vision, involuntary jerkings of the whole frame, convulsions, followed by great prostration, hiccup, short and painful howling, tottering walk, ardent thirst, dyspnœa, violent palpitations, no critical evacuations, death, preceded by frightful convulsions. P.M. Venous blood very coagulable, a little serosity in the pericardium, left ventricle thickened and inflamed, with petechiæ or patches of the colour of wine, forming a kind of pellicle, which could only be removed by long washing and rubbing.—*Gaspard.*

77. *Animal putrilage.*—Made from dogs' blood and beef gravy. Half an ounce injected into the jugular of a dog. Instant gulping; dyspnœa; evacuation of fæces and urine; in an hour great prostration; frequent gelatinous and bloody alvine dejections; red conjunctiva; painful chest; death in three hours, preceded by bilious gelatinous and then bloody vomiting. P.M. Lungs gorged, in colour violet, with ecchymoses or petechial spots, so also the left ventricle; gall bladder, spleen and subcutaneous cellular tissue had petechial spots; serosity in peritoneum; rectum and duodenum quite livid, and covered with matter of the colour of wine-lees; mucous membrane of stomach slightly inflamed; that of duodenum and rectum considerably so, being of a livid colour with black spots. In another case the most violent dysentery occurred, and death in two hours and a half.—*Gaspard.* A few drops of putrid water injected into the veins of animals, produce all the symptoms of malignant fever; the blood escapes from its vessels in all parts of the body, under the skin it forms livid spots analogous to the petechiæ of typhoid fevers, exhaled on the surface of the mucous membrane of the stomach it produces that fatal symptom, black vomiting.—*Magen.* These effects probably depend upon a putrid volatile oil.—*Lassaigne.*

78. *Vegetable putrilage.*—From cabbage; selected because it furnishes, on decomposition, sulphur and ammonia, and thus approaches to animal matter. July 14th, Two and a half ounces into the jugular of a large dog. Gulping, vomiting, and faintness during the operation, some hours afterwards general uneasiness, chest painful under pressure, respiration embarrassed, difficult and plaintive, appearance of pneumonia. In nine hours a copious fœtid stool black as soot, analogous to the dejections in melæna, and formed of fæces, mucus and putrid blood; shortly afterwards a second motion of a similar nature. 15th, Faintness, adynamia, faltering step, feeble pulse, excessive thirst, weak respiration. A remarkable, irregular action of the heart, which beat at intervals with a force and noise characteristic of the last stage of hypertrophy or aneurism. 16th and 17th, Symptoms moderated. 18th, Extreme debility, tottering gait, excessive thirst, eyes red, inflamed and covered with mucus, nostrils tumid and stuffed, mucous lining of mouth very red and inflamed. About noon a stool was passed containing clots of blood, and having the odour, consistence and appearance of pus. At night the animal expired, five days after the operation. P.M. Skin, subcutaneous tissue and muscles dark as after death from asphyxia, not altogether exempt from inflammation; conjunctiva and mucous membrane of mouth deep red or violet, and coated with mucus; lungs slightly inflamed; brown patches upon the left ventricle of the heart like ecchymoses, and not altogether confined to the surface; right ventricle nearly filled with a large fibro-albuminous concretion, weighing 2½ drs, and adhering to a portion of surface not larger than the nail, which seemed inflamed and rugged, it extended into the pulmonary artery, venæ cavæ, the vena azygos, and the axillary and right jugular veins. Mucous membrane of the intestines, especially of the duodenum, rectum, and some of the small intestines of a violet-red colour, and inflamed, but not thickened nor ulcerated, resembling much the effects of ecchymosis.

Internal membrane of rectum still more affected, its mucous glands much enlarged, and it contained puriform matter similar to that voided in the last dejection. The rest of the canal contained mucosities of a greyish white colour and thick consistence. Mesenteric glands filled with blood, and much inflamed. Gall bladder mottled externally with brown and violet spots, and filled with a black thick and ropy bile, like melted pitch. This experiment frequently repeated with corresponding results, but more especially the symptoms of dysentery, melæna, and low fever.—*Gaspard.*

79. *Diseased Blood* of a glandered horse injected into the veins of a sound horse, communicated the disease.—*Professor Coleman.* Blood of a horse, labouring under malignant anthrax, produced the same disease in another horse.—*Leuret* and *Dupuy.* The blood of a dog, killed by the injection of narcotine, destroyed a chicken by injection; that from a rabbit, under the influence of the same substance, occasioned drowsiness, languor, and pandiculation in another rabbit for nearly a day.—*Dieffenbach.* Leeches, applied to a rabbit under the influence of narcotine, died in convulsions.—*Idem.* The blood of a woman who had been taking hydrocyanic acid, killed five successive dozens of leeches applied to the epigastrium.—*Dr. Graves.* The blood of a person six hours after taking oxalic acid, produced the death of leeches applied to the epigastrium.—*Christison.* The blood of an animal poisoned with nux vomica, injected into the veins of another animal, the latter perished from the usual effects of that substance; the same substance having been inserted into the paw of an animal after tying a ligature around the leg, the blood obtained from between the wound and the ligature, produced the death of another animal by transfusion into its veins, while the animal into whose paw the poison was inserted escaped.—*M. Verniere* quoted by *Dr. Roupell.* The blood of persons labouring under confluent small-pox, introduced into the veins of animals, produced the most severe symptoms and death; that which proceeded from an epistaxis in a patient with putrid fever and gangrenous pustules, injected into the femoral vein of a dog, produced bilious vomitings, dyspnœa, dry brown tongue, frequent irregular pulse, increasing prostration, and death in about 7 hours; the post-mortem appearances were those of putrid fever.—*Gendrin, Andral.*

In reasoning upon the numerous facts here collected together, we have to bear steadily in mind the differences between the constitution of man and that of other mammalia; we must not disregard the complicated nervous system, and the infinitely varied life of relation enjoyed by the former, and we have to allow for the modified effects which inorganic agents produce in different organised systems. Without any knowledge of the molecular changes which occur in the blood from the admixture of foreign materials, a subject all but totally neglected, we learn by these facts that the greater number of symptoms which grouped together in an infinite variety of ways, constitute diseases, from the most simple flux to the most complicated fever; that structural diseases of the organs, as congestions, inflammations, suppurations, gangrene of the liver, the lungs, the brain, and that death, in a variety of shapes, are the consequences of vitiated blood. Vitiated blood will excite convulsions, tetanus, and result in death by the brain and nerves; vitiated blood will stop the action of the heart for ever; vitiated blood may produce death by the lungs; vitiated blood will occasion the arrest of its own course through the capillaries; vitiated blood, which cannot be arterialised in the lungs, ceases to communicate heat, and motion, and life to the organs and structures,—destroy the life of the blood, and you extinguish that of the individual.

In conclusion, Sir B. Brodie, Magendie, and other physiologists, have asserted that oil of tobacco and other substances produce these effects *instantly* when applied to the animal economy; the first gentleman states that oil of bitter almonds having been applied to the tongue of a cat, "she was instantly seized with violent convulsions," and that "from the instantaneousness with which the effect was produced, we may conclude that this poison acts on the brain through the medium of the nerves without being absorbed into the circulation:" the latter compares the action of prussic acid in quickness to the cannon-ball or thunderbolt. The greatest stress has been laid by physiologists and physicians upon this instantaneousness of effect, and it has been employed as an irrefragable proof that medicines and poisons act generally upon the animal economy through the "sentient extremities of the nerves." If it were true, in the sense in which we speak of light as being instantaneous, it might, perhaps, hold as an argument, but the experiments of Mr. Blake and others, from the care with which they have been performed, and the strict attention which appears to have been paid to this important point, establish the fact, that when active substances are even introduced directly into the blood-vessels, an interval of time sufficient to admit of their being conveyed with the blood to the structures and organs upon which they produce their effects, *always* elapses.

LECTURES
ON THE
ORGANS OF REPRODUCTION IN THE ANIMAL KINGDOM.

DELIVERED IN THE ROYAL COLLEGE OF SURGEONS, LONDON.

By PROFESSOR OWEN, *F.R.S.*

LECTURE IX.—MAY 9, 1840.

REPRODUCTIVE ORGANS OF INSECTS.

THE study of the generative economy of insects is replete with the most interesting and beautiful facts. In the previous lecture, the anatomy of the male organs was considered. The entire class consists of distinct males and females; the only instance in which an hermaphrodite organisation has been suspected to exist is in the genus Aphis, the plant louse, which possesses the extraordinary power of producing eight successive generations of fertile females, the fertilising power being dissipated only in the ninth and tenth. The females are provided with eight tubular ovaria. In the male, there are four, five, or six secreting utriculi, opening into a common vas deferens, which has a separate termination in a distinct penis at each side; there are, besides, vesiculæ seminales.

In the female organs of generation of insects there is scarcely less variety than in the males. Thus, in the Cetonia there is a common efferent duct, which divides into two branches, and these again into ten ovarian tubes; besides three accessory follicles, of which the third is very much dilated. There is no distinction of structure between the oviducts and ovaries in the insect tribe. In the Diptera, which present a very simple type, there are, as in the Chameleon fly, two ovarian sacs and three accessory glandular organs. The Hive Bee is provided with the means of becoming the mother of a numerous progeny, by the multiplication of simple tubular ovaria. An accessory glandular organ communicates with the vaginal canal; and a second, much dilated and connected also with the vaginal canal, is the apparatus for the secretion of the poison.

In Lepidoptera, the tubular ovaria are coiled in a beautifully spiral manner. Near their vaginal termination is a membranous bag, the spermotheca, for receiving the male fluid and the intromittent organ, a glandular sac, and a smaller one analogous to the poison bag of the bee, secreting, very probably, some adhesive fluid for agglutinating the ova, after their extrusion.

Herault and Rudolph Wagner have explained the mode of development of the ova of insects, in their excellent and elaborate researches. The ova of insects are constantly disposed within the ovaria in strings. At first, a vesicle alone is apparent, around which a second vesicle is formed, which becomes gradually separated from the first by the endosmose of a peculiar fluid. Reaching the expanded portion of the ovary, a third investment is produced, and a granular vitelline matter deposited within the second or vitelline membrane. After impregnation, the germinal vesicle and spot are lost, and the vitelline granules assume the form of small globules. (The lecturer here read a quotation from the history of the museum, showing that the attention of Hunter had been particularly attracted to the mode in which the impregnation of such great numbers of ova from a single coitus took place.) Hunter, examining the silk-moth during the period of coitus, observed the penis to be lying within the spermotheca of the female, with a quantity of secretion in the form of a granular fluid. Hence he inferred the use of this sac, and was enabled to understand how the last deposited ova were equally impregnated with the first. The length of duration of the coitus he ascertained to be about ten hours. Having made these observations, his original mind immediately suggested to him certain experiments, which he at once carried into effect. Removing the secretion from the vesiculæ of a male, he gently brushed, by means of camel's-hair pencil, the ova of a female that had been carefully kept from any contact with the male, just as they were excluded from the vagina; eight of these ova hatched, while those which were untouched with the fecundating fluid did not produce young. He thus accomplished, as did Spallanzani in his experiments on the frog, an artificial impregnation. He observed, moreover, that the fecundated ova adhered to the surface upon which they were deposited, while the unfecundated had no such attachment; therefore he considered that male fluid performed an additional office in supplying to the ova a glutinous investment by which their adhesion was procured. Having satisfied himself that the ova of an unimpregnated female were not capable of being hatched, he opened an impregnated female for the purpose of proving that the male secretion was actually poured into the spermotheca. Upon removing the fluid from this bag, and brushing it, as in the former experiment with the male fluid, upon the ova of an unimpregnated female just as they escaped from the vulva, he obtained the same results that he had previously established in the instance of the fluid from the male vesiculæ seminales.

In some insects a certain amount of development takes place within the oviducts, as in the Aphis, in which the young, during

the summer season, are born alive. On the approach of cold, ova alone are deposited. At the end of summer, the parents are provided with wings; it is then that coitus occurs and eggs are deposited, from which the young aphides are developed. It is only those that are produced from ova that possess distinct sexes. In some species a true metamorphosis takes place within the oviducts. Thus the Musca carnaria, or flesh-fly, deposits living larvæ; the Hippobosca, or forest-fly, deposits pupæ; but the greater part are oviparous.

The ova of insects are as various in form as the seeds of plants; thus, we find them spherical, oval, pyriform, oblong cylinders, &c. The ova of the dung-fly are furnished with two long and arm-like projections, which prevent them from sinking below the surface. Atmospheric air is as necessary to development in the animal as it is in the vegetable kingdom; and certain experiments lately performed,* with a view to prove that the development of the ova of the fowl may proceed when air is entirely excluded, will be shown, in the course of these lectures, to be both unphilosophical and fallacious. The ova are deposited in a great variety of modes, some in the form of an aggregated mass of oblong cylinders; others, as of the yellow-tailed moth, are inclosed in a warm nest, formed of the minute feathers picked from the body of the mother; others are disposed, in a spiral direction, around the branches of trees, &c. The ova in one instance of an aquatic insect, are furnished at the extremity with a star, by which they are enabled to float near the surface.

The condition of an insect, on quitting the ovum, defies all comparison with its perfect state, hence it was named *larva* by Linnæus. The mask is not, however, so complete in all the orders; in Orthoptera and Hemiptera, the young are so similar in form to the adult, that the term larva is scarcely applicable. When the larval and perfect forms are so nearly similar, the larvæ have been designated Homomorphous. Among the Neuroptera, the young of the dragon-fly very closely resemble the parent in external form, but differ considerably in internal organisation. Thus, the alimentary canal is larger and more capacious; the mandibles of the larva are modified in the adult insect, and the lower lip is bent beneath the breast, and terminates in two lobes. In the family Cicadæ, of the order Homoptera, an incomplete metamorphosis occurs; the external skin is thrown off by ecdysis, and the animal is then furnished with wings. The ecdysis is not, however, confined to the exterior, for the lining of the alimentary canal is also loosened and cast off. The true, or Heteromorphous larvæ, are divisible into two groups, Apodous and Acephalous, according as they may be deficient in feet, as is the case with the Diptera, and many of the Hymenoptera; or have no head, as the Diptera. The hexapodal larvæ are provided with well-formed heads, whilst the hyperhexapodal have six true and six false feet, as the ordinary caterpillar. The larvæ of some insects simulate Entozoa in their habits, as do those of the Œstrus equi, which deposits its ova upon the shoulders or fore legs of the horse; they are then licked from the skin by the animal, and conveyed into the stomach, where they become hatched, and attach themselves by means of sharp, recurved, mandibular hooks. Although unprovided with legs, the larvæ are furnished with several rows of hooks, which are placed along the edges of the segments, and project in such a manner as to oblige them to move, in a given direction, along the alimentary canal. The larvæ of the Œstrus bovis and Œ. tarandi are deposited beneath the skin of the animal, and, therefore, in place of moving onwards in a certain direction, require to be stationary; hence, they are provided with several rows of short spines, pointing in opposite directions.

The larva of the Musca putris buries itself in the mud of pools, and being provided with tubes which reach the surface, is enabled to pump down fresh air, as its wants may require, just as the miner is supplied in the diving-bell. Others have a radiated expansion at the extremity of the tail, by which they are enabled to carry down a bubble of air to the bottom, and rise for more when the oxygen in that is consumed.

In the bee the development of the larvæ is very remarkable. The larval state of insects generally is the period of industry, during which they feed abundantly, and prepare for all the subsequent changes which occur in their economy. The perfect condition is, on the contrary, a very brief period, and its principal object the propagation of the species. The larva of the Melalontha, or Cockchafer, lives an active and destructive life for three or four years, while its period of existence in the perfect state is summed in as many weeks. In social insects, as in the bee, the order is reversed. When the queen bee, with her drones and labourers, quits the parent hive, for the purpose of founding a new commonwealth, the comb is commenced, and the larvæ produced in the course of five days; they are then fed most assidnously by the nurses for four days more, when they go into the pupa state. The nurses, which are females with undeveloped sexual organs, then close the cell, and in ten or fifteen days the young bee creeps forth. It would seem to be a general law among insects, that the young never receive any attention from their parents; in the case of the bees the nurses are their

* This is an allusion to the experiments made by Mr. Towne, of the Guy's Hospital, and detailed in the Guy's Hospital Reports.

foster parents. The queen is impregnated in the autumn, and deposits her eggs in the spring. The Wasps lay up no store, and the whole community is destroyed during the winter by cold and famine. From this general destruction, one male and one female, perhaps, alone escape; and they, as soon as the spring returns, set to work most assiduously to construct their beautiful nests. When the ova are hatched, the mother tends the larvæ anxiously, until they break forth from their case: as soon as ten or twelve are thus born, the economy of the bees is immediately adopted, and the mother forsakes her larvæ. A few only of the females continue to deposit eggs, while the others take on the duties of nurses. The duties of the nurses cannot be looked upon as the result of reason, but as a mere mechanical and instinctive act: but there is one phenomenon in the history of the wasps that seems to pertain to a reflective power. So soon as the winter approaches, and the elder wasps feel that the warmth and food are gone, they would seem to foresee the necessary and painful destruction of their numerous progeny, and the probable ill consequences to themselves arising from their death and decomposition within the cells. They act in such a case as rational beings would in an equally urgent position, when every alternative would be hopeless: the nurses suddenly change their instincts, burst open the cells, drag forth their unfortunate victims, murder them by hundreds, and then cast them forth from the nest. The Humble bee, in its general economy, resembles the hive bee and wasp; it forms rude cases to contain its young and honey, and deposits them in cells which it excavates in the earth.

Quitting the hymenopterous insects, let us next examine the condition of the larva of the Neuroptera. The larva of the Myrmeleon, or Ant Lion, is not unlike the arachnida in form and habits; it digs a deep pit in the sand, and buries itself at the bottom, so that every part of its body, with the exception of the strong maxillæ, may be concealed, and lies in wait for its prey. As soon as an insect of any kind stumbles into the pit-fall, it is immediately seized upon and devoured by this voracious creature. In its perfect form it becomes a neuropterous insect, very similar in appearance to a dragon fly. The larvæ of Coleoptera have enormously strong jaws, and are converted into incomplete pupæ. The pupa of Lepidoptera is inclosed in a semi-transparent case, which permits the outline of the perfect insect to be distinctly distinguished through it.

The larval state is very interesting, from its being one in which important changes, preparatory to the perfect condition, are taking place, without the presence of any of the phenomena of life. In the larva there are thirteen segments; the alimentary canal is capacious and large; there is a lengthened dorsal vessel, double nervous cord with ganglia, and a concentration of the two last ganglia. In the pupa state there is a shortening of all these structures, without increase in bulk; the segments are drawn under each other, and growth becomes active in the cephalic and thoracic portions. In the head, the mandibles are lost, and a long and coiled sucker is produced; the thorax is formed by the consolidation of the second, third, fourth, and part of the fifth segments. The dorsal vessel becomes shortened; the muscular system diminished in some, and increased in other parts; the nervous ganglia approach nearer towards each other, and, in certain situations, become confluent.

In the perfect state of the insect, the ganglia, from the third to the sixth, have become concentrated into one. The lepidopterous insect eats very little food in its imago state, and there are some, as the Ephemera, which possess no mouth.

Herault has most carefully recorded the changes which take place, from day to day, in the development of these insects. In the larva, the salivary glands and silk glands are of large size; in the pupa, they are much smaller, and gradually disappear; in the imago the stomach becomes shortened, and a cœcal bag is developed from the anterior part of the œsophagus, which serves as a nectar bag. The generative organs, even in the larva, are already apparent.

Mr. Owen observed, at the conclusion of this lecture, that to give but a brief summary of the history and peculiarities of the insect tribe, would require more lectures than the whole of which the present course was to consist. He, therefore, apologised to those scientific entomologists who might be present, for passing so discursively over the subject, and taking leave of it, as he now did, completely, to engage in his next lecture on another theme, the organs of reproduction in the molluscous classes.

UNIVERSITY OF GLASGOW.

A new chair of mechanics and civil engineering has been instituted with a salary of £275. The following additional salaries have also been granted by Government:—

Chemistry, £150 in addition to the present salary of £50.

Botany, £50; ditto, £150.

Natural History, £50; ditto, £100.

Materia Medica, £100.

Surgery, £25; in addition to present salary, £50.

Theory of Medicine, £75.

Forensic Medicine, £75.

PATHOLOGICAL CONTRIBUTIONS.

BY WM. MUNK, M.D.,

Physician to the Tower Hamlets Dispensary.

DIAPHRAGMATIC PLEURISY, ISSUING IN EMPYEMA; WITH CONSIDERABLE ENLARGEMENT OF THE SIDE.

A GENTLEMAN, æt. 36, on the 18th of October, 1839, whilst rowing a small wherry, was precipitated into the Thames. Some short time elapsed before he got out of the water, when he went to a public-house at Battersea, called for brandy and water, of which he drank two glasses, ordered a cab, and came forthwith to his residence in the City. He went at once to bed, but, still feeling cold, and shivering, had another glass of spirits and water. He slept but little during the night; the shiverings continued till eleven or twelve o'clock, when reaction took place. During the remainder of the night he was hot and restless, complained of pain in the head, and a sense of weakness over the whole body.

I saw him in the afternoon of the 19th. The face was then flushed and tumid, the skin hot, tongue white, pulse 94, full and strong. He complained, too, of rheumatic pains about the lower extremities. He was bled to sixteen ounces, had a full dose of calomel, and, after this, a common purging draught.

On the 20th, I found the feverish symptoms rather increased than diminished; the pains of the lower extremities had become more pronounced; the expression of countenance anxious; the breathing short, hurried, and irregular; he complained of an overwhelming oppression about the chest, and of severe pain in the left side, extending along the ribs to the back; the pulse had risen to 100, and was sharp and incompressible; there was a short, dry, and irritative cough occurring at intervals, and adding much to the sufferings of the patient. On stripping off his night dress, it was found that respiration was carried on principally by the right lung, the upper portion of the left acting but little, whilst the lower portion was perfectly motionless. He was desired to take a deep breath; the effort was made, but quickly desisted from, on account of the urgent pain thereby produced along the edge of the false ribs on the left side. A careful examination of the chest failed of detecting any thing, save an increase of impulse in the heart's action, with absence of respiratory murmur in the left inferior lobe, which sounded, however, perfectly well upon percussion. I had him again bled to a pint, ordered thirty leeches to be applied to the præcordia, and directed three grains of calomel, with half a grain of opium, to be given every four hours.

For three days the symptoms continued much the same, and the anxiety of countenance increased. During this period he had, in all, forty-eight more leeches applied. The mouth now showed commencing mercurial action, and the full production of ptyalism was followed by a notable relief of all the symptoms. The pain ceased, the respiratory murmur was now heard over the whole chest, and in the lower part of the left side, where it had hitherto been wanting, could be heard, almost equalling in intensity that of the right lung. The respiratory act, natural on the right side, was, however, entirely costal on the left. I am free to confess that the patient, at this time, presented symptoms which I could in no degree explain. For four or five days he was apparently mending, when a haggard look was observed, and, although all pain had ceased, he complained of there being substituted in its stead a sense of weight and fulness of the side.

On the following day, Oct. 30th, I examined the chest with the utmost care, but with the same negative results, and, being called that evening some distance into the country, I could not again visit Mr. W. until the evening of the 2nd of November. I found him sitting in an easy chair, in some respects improved; his body, however, bent forwards on his knees, with an inclination to the left side; the sense of weight and oppression had become more urgent; there was considerable dyspnœa, which was much increased on assuming any other position than the one above indicated; his sleep was disturbed, and a feeling of suffocation prevented his lying back in bed; he became hot and feverish towards evening, and the pulse was small, and ranged from 100 to 120 in the minute. Auscultation and percussion now satisfied me of the existence of pleural effusion; there was fulness of the left hypochondrium, and a bulging out, to a slight extent, of the false ribs of that side.

It would be superfluous to transcribe further my daily notes of the case; suffice it to say, that, despite all means I could devise, the effusion went on increasing; at length the respiratory murmur was only audible as low down as the second rib; the heart was gradually pushed from its normal situation, so as ultimately to pulsate near an inch to the right of the sternum; the left side became much dilated, and the false ribs protruded to a great extent; beneath these, the spleen and diaphragm could be distinctly felt. Paracentesis was proposed, but to this neither the patient nor his friends would consent. The respiratory function became more and more embarrassed, and he died on the evening of the 2nd of February.

Examination of the Body Thirty-six Hours after Death.

There was great emaciation. The left side, upon admeasurement, was found to be fully an inch larger in circumference than the

right, and contained between nine and ten pints of a semi opaque, whitish fluid, having numerous flocculi, or shreds of lymph, floating in it. The lung was much diminished in size, and was compressed upwards, inwards, and backwards. This diminution of the lung was owing especially to the compression of the lower lobe, and of the inferior position of the upper. The superior portion of the upper lobe was united to the costal pleura by old adhesions; it contained some miliary tubercles, and was still pervious to air. The lower lobe was compressed to somewhat less in size than a common orange, and was situated close back upon the spine. The costal pleura was slightly opaque, but in every other respect healthy. The diaphragm, towards the chest, was perfectly concave, and the pleura covering it was coated with a layer of soft lymph of about a line in thickness. This could be easily detached with the handle of the scalpel, when the subjacent pleura was seen, of a yellowish white colour, opaque, and apparently thickened, presenting numerous striæ, and dots of a red colour. The muscular portion of the diaphragm on this side was darker than natural; its fibres indistinct, and, if any thing, a little softened. Two-thirds, at least, of the heart lay to the right of the sternum, the remaining portion under the right half of this bone; the mediastinum was also pushed considerably to the same side. Nothing abnormal was observed on the right side of the chest, save a few tubercles in the upper lobe of the lungs. The diaphragm was convex towards the abdomen, and had pushed downwards the spleen, at least an inch from its natural locality.

Diaphragmitis, properly so called,

or inflammation of the muscular and fibrous textures of the diaphragm, is, undoubtedly, a very rare disease. So much is this the case, that it has been doubted by some authors, and, perhaps, with justice, if such a condition as a primary affection does, in reality, exist. The majority of cases on record, detailed with sufficient precision, evidently consist but of inflammation of that portion of the pleura covering the muscle, or, at most, if the tissues subjacent thereto have been implicated, this occurrence has been secondary to pleuritis, and dependent, apparently, on contact with an inflamed part, and the extension of morbid action therefrom by contiguity.

That the symptoms commonly looked upon as indicative of this disease, are attributable rather to inflammation of the pleura than to that of the diaphragm itself, seems to have been pretty clearly understood by Boerhaave, although his excellent and learned commentator, Van Swieten, has failed in the recognition of this fact. A reference, however, to recorded cases, will not fail of establishing the relation here alluded to.

By writers of early times the frequency of diaphragmitis has, perhaps, been overrated. More recently, however, physicians would seem to have fallen into an opposite error, that, namely, of regarding the disease as of rarer occurrence than is, in fact, the case. This error has been pointed out by Boerhaave in the following aphorism, which Stoll, a high practical authority, copies verbatim:—"Longe frequentior quam vulgò quidem censetur licet præsens, sæpe ignoretur, negligatur vel alterius morbi titulo tractetur." The truth of this assertion is borne out by a reference to the records of post-mortem examinations and clinical practice. Numerous examples of it are to be found in the writings of Morgagni,* De Haen,† Andral,‡ &c. Five cases, indeed, have fallen under the observation of the last-mentioned author alone.

The symptoms indicative of this affection have been minutely detailed by authors, and with such an apparent degree of certainty and precision, as would *à priori* seem to indicate an extensive practical acquaintance with the disease. Recent observations have tended, however, to throw some doubt upon much of the symptomatology of diaphragmitis as received by our predecessors.

The 909th aphorism of Boerhaave, where, in his usual terse and vivid style, he describes this disease, may be taken as a correct epitome of the views generally entertained by the most approved of his predecessors and contemporaries. It is as follows:—"Cognoscitur ex febre acutissima continua, dolore inflammatorio loci intolerabili ob membranas nervosas, qui dolor immaniter augetur in inspiratione tussi sternutatione, repletione stomachi nausea, vomitu, compressu abdominis in alvo vel urina reddendis, respiratione hinc sublimi, parva celeri, suffocativa quiescente abdomine solo thorace peracta risu sardonico, convulsione, furore, gangræna." We need go no farther than the *risus sardonicus*; a symptom particularly commented upon by writers, and by many looked upon as next to pathognomonic of this disease, to prove how little is the dependence to be placed in the descriptions of diaphragmitis which have by them been handed down to us. In the five cases recorded by Andral, this symptom was never present; and so slight is the importance attached to it by this distinguished pathologist, that he summarily disposes of the subject by saying, "with respect to the *risus sardonicus* noticed by Boerhaave, Van Swieten, De Haen, &c., we

* De Causis et Sedibus Morborum Epist. VII. art. 13, 14; Epist. VIII. art. 25; Epist. XXI. art. 35, 36; Epist. LIII. art. 5, 6.

† Rat. Medendi, Par. IX. Cap. I. § V. Edit. Viennæ, p. 28, seq. Cap. II. § VII. p. 66, seq.

‡ Clinique Medicale, 2mè édit. Tom. II. p. 494, seq.

have never observed it." Much in the same manner, I believe, may we speak of the delirium noticed by many authors as an attendant of the disease. Without any wish to derogate from the intrinsic value of the works of the authors above mentioned, or to depreciate the advantages resulting to the practitioner, from a careful study of these, and of the great body of ancient writers (more particularly in the department of prognosis), it must, nevertheless, be admitted, that to the works of modern pathologists must we chiefly turn, if desirous of obtaining a satisfactory knowledge of the disease now under consideration. In the *Clinique Medicale* of Andral, and in the article "Pleuritis," by Dr. Law, in the Cyclopædia of Practical Medicine, do we find this subject very ably handled.

The latter of these writers states, that "its characteristic features are, in addition to the ordinary constitutional symptoms of acute pleurisy, pain more or less severe of the cartilaginous border of the false ribs extending into the hypochondria, and even the flanks, complete immobility of the diaphragm in inspiration, which is performed by the elevation of the ribs; orthopnœa, with an inclination of the body forwards an inexpressible anxiety of countenance, marked by a sudden change of features; the respiration more hurried and jerky, than in ordinary pleurisy; the voice low and interrupted; a frequent desire to cough, but an obvious dread of it from the pain which it causes."

The Case.

Many of the phenomena above mentioned were observed in the case we have related; others, however, existed, which have either no place in Dr. Law's description, or are but slightly referred to. Upon some of these, I shall now proceed to offer a few remarks; and lest I should intrude at too great length upon the pages of THE LANCET, I shall confine my observations to those which, in a physiological, or a diagnostic point of view, appear to be the most curious and important.

Of these undoubtedly are the modifications observed in the respiratory act at different periods of the case, and the peculiarities of the auscultatory phenomena coincident therewith.

At the onset of the attack we find the lower portion of the left side perfectly motionless, and the respiratory murmur wanting in the same locality. The perfect resonance of the part upon percussion, and the absence of the auscultatory signs of consolidation of the lung on the one hand, and of pleural effusion on the other, suffice to prove that the symptoms observed were independent of either of these two conditions. The existence unimpaired, moreover, of every physical condition for the complete performance of the respiratory act, obliges us to look further for an explanation; to functional derangement must we, therefore, turn for a solution of the question; that paralysis had at this time no share in its causation may, we think, be admitted. The presence of severe pain in this region, and of spasm which will hereafter be alluded to, affords a sufficient explanation of the symptoms. The fixed and motionless condition of the thorax was, in part, effected, it would seem, by a voluntary effort, whereby the pain excited by the thoracic movements might be obviated. A similar phenomenon is observed in cases of acute pleurisy, accompanied by severe pain. Here animal instinct at once puts a stop to the motion of the ribs, and to the filling of the lung with air. This may, in different cases, be seen to occur either in a part only, or over the whole of one side of the chest.

After repeated general and local bleedings, and the production of mercurial ptyalism, pain ceased. Coincident with its cessation was a remarkable modification in the former symptoms; a circumstance no other than we should *à priori* expect, if the explanation above offered be correct. The respiratory murmur now appeared in the situation where it had hitherto been wanting, and the respiratory movements of the left side were solely effected by the ribs.

The return of respiration in the part is easily explicable by the relief of pain and of spasm, with the consequent removal of the necessity for restraint in the action of the thoracic parietes; but the occurrence of purely thoracic respiration cannot be thus explained; its supervention was to me quite as unexpected as it was at the time inexplicable. On a view, however, of all the then existing circumstances of the case, together with the additional light thrown thereon by those which subsequently appeared, and by post-mortem inspection, it does appear that a just explanation may be arrived at. Considering the subject of empyema with protrusion of the intercostal muscles so usual a concomitant of the disease, a close analogy with the present case will, we think, be found to obtain; and the explanation of muscular displacement given, by Dr. Stokes, will more satisfactorily account for the phenomenon in question than any other with which we are acquainted.

The researches of this gentleman as originally published in the ninth volume of the "Dublin Journal of Medical Science," and incorporated with the ninth section of his excellent Treatise on Diseases of the Chest, have shown pretty clearly that the occurrence of muscular displacement is attributable to inflammation of an adjacent structure, giving rise at first to increase of innervation in the muscular fibre as evidenced by pain and spasm, and then to paralysis, more or less complete, upon the supervention of which, if there exist any pressure on the part, displacement of course ensues. These opinions throw considerable light upon the

present case, as the case adds a confirmation to the validity of Dr. Stokes's views.

Admitting now (as we justly may) that the earlier symptoms, severe pain, urgent dyspnœa, and the fixed condition of the side of the thorax, originated, in great measure, in an increase of innervation in the diaphragm, as evidenced by pain and spasm, we may equally allow that the modification of these phenomena, observed at the second period of the case, namely, cessation of pain, diminution of dyspnœa, and the substitution of costal respiration for immobility of the inferior portion of the affected side, must have been dependent upon some alteration in the condition of the diaphragm itself: that this alteration consisted in the occurrence of paralysis, there can be little doubt. Upon this supposition—and apparently on this alone—can we arrive at a satisfactory explanation of the change; the cessation of pain requires no comment. The partial relief of the dyspnœa is attributable to the diminution of pain and spasm; the modus operandi of the former of which, in its production, has above been glanced at; whilst, as regards the latter, its influence must be self-evident.

To the style of respiration let us now pass. Will the admission of paralysis of the diaphragm afford us a satisfactory explanation? Are the symptoms equally well explained on any other supposition? We hope to show in the sequel, that the former query may be answered in the affirmative; the latter, in the negative. The respiratory act consists in the united motions of many different parts, the aggregate result of which is an alternate enlargement and diminution of the thoracic cavity; this, upon analysis, is resolved into an enlargement, and subsequent diminution upwards, outwards, and downwards. With the latter of these only have we here to do. The part chiefly concerned in its production is the diaphragm, which, in a state of rest, presents a convex surface towards the chest. When acting, the muscular fibres forming its circumference contract, and, pulling upon the central tendinous structure, draw it downwards almost to a level with their own most fixed attachment, namely, the ribs; in this way diminishing the convexity towards the chest, and increasing, consequently, in the same proportion, the thoracic cavity. The abdominal contents, at each descent of the diaphragm, are pushed before it, and the parietes of this cavity, offering but little resistance, are pushed outwards at the same time. In this way does the extent of abdominal protrusion become an index of the amount of diaphragmatic descent.*

Upon the occurrence of paralysis of the diaphragm, its own inherent action of course ceases; it remains in a passive state, convex towards the chest, the cavity of which now undergoes no enlargement downwards. The diaphragm, no longer descending at each inspiration, the abdominal viscera remain unaffected, and the parietes without protrusion. The diaphragm and abdominal muscles thus ceasing from their part in the performance of respiration, the act becomes, consequently, entirely costal.

Some days after the occurrence of paralysis, the patient complained of a fulness and weight of the side, and, after a short interval, there appeared a bulging out of the false ribs. This was dependent, it would seem, on depression of the diaphragm from the pressure of fluid, now effused into the pleural cavity. With the gradual increase of the effusion, there was a progressive dilatation of the left side of the chest, which ultimately became, at least an inch larger in circumference than the right. The intercostal spaces, however, continued natural to the last; and, although the heart and mediastinum were extensively displaced, there was not the slightest appearance of intercostal protrusion. This can only be explained by the healthy condition of the costal pleura, the influence of an inflamed condition of which, the researches of Dr. Stokes abundantly testify.

In conclusion, I would remark, that much valuable information respecting this disease is to be gathered from the author I have above quoted. To these may be added, the "Dissertatio de Inflammatione Diaphragmatis" of P. G. Schroeder, published at Gottingen in 1771, and reprinted in the second vol. of his "Opusc. Medic. Collect." p. 260;" an essay by Klijnpennink Antwood, op de vraag over het juiste denkbeeld, de Kentcekenen enz. der Paraphrenitis," I remember to have heard highly spoken of in the lectures of the Professor of Physic at Leyden. Not possessing a copy of the publication in which it appeared, "Handelingen van het Geneeskundig Genootschap Servandis Civibus," and not being able to meet with it in any of our public libraries, I can only give its title for the reference of those who may have access to the work. To these I would add the systematic works of Burserius and John Peter Frank, and the elaborate Dictionary of Practical Medicine by Dr. Copland.

2, Finsbury-place, South,
May 16th, 1840.

* The lectures of Dr. C. J. B. Williams, on the physiology and diseases of the chest, contain an excellent account of the physiology of respiration. This has been no where so well described as in the lectures now referred to.

TOPICAL APPLICATION OF THE

TINCTURE OF IODINE.

By RICHARD LANYON, *M.D., F.A.S., &c., Lostwithiel.*

IT cannot be denied that the improvement which clinical medicine is daily receiving, mainly depends on the habit of close investigation now so universally followed, based as it is on the tact so generally diffused, of establishing principles of practice on experimental inquiry. Matters of fact are beyond dispute, and the results of scientific attainment are landmarks for the guidance of the less experienced, inspiring confidence where there would otherwise be distrust, and becoming intrinsically more valuable from their charitable application to the relief of human suffering. The medical bookworm, that is, the man who derives his knowledge alone from the literature of our profession, is a mere theorist; one who is *au fait* at nice distinctions, but has no pretence to knowledge or facts acquired on his own account: he can lay before you the practice and conclusions of others, but attempts not to enrich the one or the other by his own clinical elucidations: not that we have a right to depreciate the making ourselves intimately acquainted with ancient professional history, or with the pathological experience of our contemporaries, but the man who, with this information alone, attempts to eradicate the pestilential influence of disease, will find himself lamentably deficient in the most important qualification which the accomplished physician requires. Without clinical experience, it is not possible to pursue our avocations with the confidence and self-possession so necessary to ensure that success, with which we endeavour to smooth the pillow of local or constitutional disease. With these prefatory remarks as my apology, I shall proceed to lay before your readers the following cases, showing the great importance of iodine as a therapeutical agent. Although this substance has for many years engrossed the attention of the medical public, a much wider sphere of action and importance appears to be attached to it, than those who introduced it to the profession, or those who subsequently tested its virtues, had the least idea of claiming. The iodine and the iodic acid in alkaline and mineral combination have been extensively and beneficially used as internal remedies, and occasionally as local applications; but it was not until lately that the iodine was discovered to possess astonishing and extensive influence as a topical remedy. Mr. Davies has rendered essential service to the profession by the publication of his excellent essay on this subject, which should be in the possession of every practitioner; it is free from dogma or theory, and is what it professes to be, a collection of clinical facts and observations. Having taken his "Practical Remarks" as my guide, I may, perhaps, be excused if I obtrude myself again on the readers of THE LANCET with something in the shape of an appendix to his "Treatise," confirmatory of his views, and bearing my humble testimony to the many practical illustrations which he has so strikingly adduced. Discarding arrangement I shall extract the cases from my journal in the order in which they are there placed.

CASE 1.—On the 6th of March of the present year, an old gentleman of excellent constitution, and a tee totaler, contracted, by exposure to cold, a pain of the right cheek, attended with considerable tumefaction. He considered the disease to have arisen from a decayed tooth; the swelling bears the character of that description of disease described by some authors as phlegmonous erysipelas. It is equally diffused (occupying the whole of the cheek) with that which characterises this distinctive form of erysipelas, but on pressure the parts are found to be unyielding, by which the complaint is more particularly distinguished from the latter disease. The whole of the cheek, and beyond the point to which the swelling had extended, was pencilled with the tincture of iodine, covering every part uniformly.

7. Swelling has abated, and the mouth can be opened with greater freedom than yesterday. Is in all respects better. The tincture to be repeated as before.

8. The tumefaction has considerably receded, and the skin is much corrugated. Let the surface be pencilled with rectified spirit.

9. The cuticle of the cheek is separating, and my patient is convalescent.

Practically interesting as this case undoubtedly is, it may, perhaps, be not altogether out of place to remark here, that my patient has been uniformly a gentleman of exceedingly temperate, nay, abstemious habits, and accustomed to considerable exercise in the open air; he has, consequently, been blessed with unusually good health; but the constitution, notwithstanding our utmost circumspection, must begin to show symptoms of wear and tear when the brow has become silvered with "threescore years and ten." The machinery, although not abused, must be expected to creak upon its hinges, as we approach the confines of the grave, after a protracted, although not injudicious sojourn in this nether sphere of existence. Of late, my patient, from accidental causes, such as blows, has had portions of the skin removed occasionally from his legs. Sluggish ulcers have been the consequence, which have readily healed on

the application of the tincture of iodine. Lately we have applied the same remedy immediately that the parts have been denuded, and the ulcerative process has not only been interrupted, but the work of reparation has uniformly been effected in a surprisingly short space of time.

Case 2.—March 20. James Jones, a labourer, applied on account of a very extensive erysipelatous inflammation of the right side of the face. It has very nearly closed the right eye, and is altogether a very well-marked case of the disease. It has extended to the forehead with that zig zag outline by which it is frequently accompanied, and is advancing rapidly to the crown of the head, whilst it is steadily pursuing a downward course. The tincture was applied freely to every part and beyond the limits of the swelling.

21. The application of yesterday was made towards the evening, and within four hours the pain had considerably diminished, which ensured him a good night's rest. The swelling is gradually receding. He requested to have the application repeated, which was acceded to.

22. Is so much better, that the rectified spirit was substituted for the iodine. Convalescent.

Case 3.—March 21. A young man, who is any thing but abstemious, during the last week has been complaining of considerable pain, referred to the back and lower part of the right thigh, with redness, but no swelling. He had been using fomentations, and has applied hot oil and wool. To-day he has become alarmed by the parts immediately below the knee becoming affected, and my opinion was solicited. I found a blush of inflammation extending from the upper and back part of the knee-joint to about three inches below it; in breadth it was about two inches. The parts are very sensitive on the least pressure, but there is no induration or swelling. The tincture was directed to be unsparingly applied.

22. The disease is still erratic, whilst the part subjected to the influence of the iodine yesterday is very much better; the inflammation has reached the ankle, and is more particularly aggravated about the external malleolus. A thick coating of the tincture is directed to be given to the whole of the back part of the calf, including the ankle.

23. Is very much relieved, although the ankle is still implicated. The whole of the back part of the leg to be penciled with rectified spirit.

24. Although rest in the recumbent position was strictly enjoined, he quitted his bed yesterday, and walked out, consequently, there is much more pain, and the limb is swollen. Spirit wash to be sedulously used.

25. Better, and the iodine to be used as before. The limb is now retained in a state of rest.

26. Much better. The iodine was no longer required, and the limb was shortly restored.

Case 4.—March 23. A delicate young female, by exposure to cold, complains of pain, heat, and swelling of the right cheek. It has that boggy feel so characteristic of erysipelatous disease, and is migratory. The parts to have the tincture applied to them immediately.

24. Swelling considerably diminished. The iodine as before. The disease disappeared without further treatment.

Case 5.—March 26. An elderly man, who is frequently an invalid, is the subject of a severe attack of orchitis. The right testicle is considerably enlarged, and exceedingly indurated and irritable. A thick coating of the tincture to be applied over and beyond the seat of disease.

27. Pain less, and swelling abated. Fearing lest the iodine, by stimulating, might produce an aggravation of symptoms, it was thought advisable to pencil the swelling with rectified spirit.

28. Still improving. The iodine as before. Pursuing the same treatment after a few days, the severity of the attack was overcome, and the parts regained their normal condition.

Case 6.—March 28. A maiden lady, about 40 years of age, was, as she is annually, much annoyed with chilblains on her feet. Two successive nights she applied the tincture, by means of a camel's-hair pencil, with the effect of eradicating every vestige of this troublesome complaint.

Case 7.—April 6. A laundress, in the exercise of her vocation, was much exposed to cold, the consequence of which was inflammation of the face. The whole of the left cheek is exceedingly florid and swollen, and does not yield in the least to pressure, with very considerable pain. Let the tincture of iodine be applied immediately.

7. Very nearly as much swollen as yesterday, and is still very red; the skin is slightly disposed to corrugate, and the parts implicated are somewhat softer; the pain is much diminished. The same treatment as yesterday.

8. Last evening the swelling was much more considerable, but this morning it has again receded. To be pencilled with rectified spirit. From this day no further treatment was necessary; the skin shrivelled and separated, and the tissues returned to a state of health.

Case 8.—April 17. E. M., a middle-aged man, has very frequently been annoyed by boils on different parts of his person. He has been complaining for several days past of pain in the right shoulder, for which he

was directed to use a liniment composed of sulphuric acid and oil, but without deriving the least benefit. On examining the joint this morning, I find it slightly swollen, but easily yielding to pressure, accompanied with a slight blush of inflammation, and very tender. Immediately in the neighbourhood is a boil, which has degenerated into an ulcer. He was directed to take a saline purgative immediately, and to have the tincture of iodine, diluted with rectified spirit, applied freely over the seat of pain and on the ulcerated surface.

18. The pain was much mitigated in four hours after the application of yesterday. To-day he complains of considerable uneasiness at about the middle of the right arm; shoulder less swollen, and much cooler; voluntary motion of the arm is altogether suspended; the ulcer is fast improving. The shoulder and parts adjacent to be treated as yesterday, and the tincture, in full strength, to be applied to the arm. By pursuing this plan for a few days the ulcer granulated and healed, and the pain and swelling subsided. Voluntary motion, however, was not restored until after the lapse of a fortnight or three weeks.

Case 9.—April 18. A robust young man, aged 28, has a large boil beginning to suppurate on the posterior and upper part of the left thigh, accompanied with much swelling and hardness. He has been poulticing and fomenting, and has taken a saline purgative. The tincture of iodine to be applied liberally over every part of and beyond the tumour. Repeat the purgative.

19. Thick pus is oozing from the boil; the pain is very much abated; the tumefaction is diminished; and he is, in all respects, more comfortable. Repeat the application. Further history would be superfluous, as my patient, after persevering a few days, was completely restored.

These are a few, and but very few, of the cases which I have treated with this powerful remedy; but your Journal is not the place for elaborate detail. No correspondent has a right to occupy considerable space, or I might place before your readers many and striking instances exemplifying the diversified utility of this invaluable agent. When I had read Mr. Davies's work, I concluded that he had over-zealously claimed too much for his remedy; but, on patiently investigating its merits, I find he is fully borne out in the assertion, that iodine is "by far the most efficient topical application in our possession."

ANEURISM OF THE ARTERIA INNOMINATA.

To the Editor of The Lancet.

Sir:—In your Number of June 6th, is contained a short account of the proceedings of the Royal Medico-Chirurgical Society, on the 26th of May, at which the history of a case of aneurism of the innominata, reported by myself, was read and discussed. Your report, though necessarily short, was correct as to the bearings of the discussion; but I am anxious to remove an impression which seemed to me to prevail at the meeting, and so reported in your Journal, that the aneurism was one, not produced by giving way of the internal coat, but simply by a dilatation of the artery at the part. The idea was suggested by the President, and I confess that at the time, in the hurry of discussion, it was somewhat embraced by myself, but on a further examination of the preparation after the meeting, at which time it was carefully observed by Mr. Arnott, Mr. Shaw, Mr. Liston, and others, it seemed quite clear that the aneurism was of the ordinary kind, produced by *rupture* of the internal coat, *not by dilatation*. This opinion is confirmed by Sir Astley Cooper, who prepared the parts, and is satisfied of its correctness. I trouble you with these observations, simply to remove, as far as I can, an incorrect opinion which may have been formed on the case, that the facts may only appear as they are. I have the authority of Sir Astley Cooper to say, that the preparation may be seen at his house, to satisfy the members of the Society on this point.

The history of this case in detail, will, I presume, appear in the Transactions of the Society, and will then again be open to the discussion of the profession. I may not be here out of place in saying, that the impression on my own mind is favourable to a repetition of the operation; and that there is much in the history of this case on which to ground the hope, that success may eventually attend the persevering efforts of surgeons to establish an operation on the principles of the ingenious propounder, Mr. Wardrop.

Your obedient servant,

W. J. Wickham.

Winchester, June 16.

MR. OWEN AND MR. NASMYTH.

To the Editor of The Lancet.

Sir:—By a curious coincidence, yourself and the conductor of the "Medical Gazette" have agreed for one week to suspend mutual abuse, and concentrate the currents of two vituperative and damnatory attacks upon one and the same hypothetical delinquent.

These attacks, though alike in foundation and spirit, manifest somewhat of the specific characters of your respective Journals. In the "Gazette" the charge is craftily preferred in the guise of an analytical notice of a work,—not the one containing the main alleged offence, and necessarily quoted to expose the same, but of another,—to which it would have been no discredit to a journalist, professing respectability, to have given fairer treatment: and, when this editor conceives that he has gained his object in damaging the character and sale of my "Odontography," he hypocritically appeals to his sense of duty as a journalist, feigns disbelief in the presumed delinquent's consciousness of his offence, and exhorts him to penitence and confession. You, Mr. Editor, bolder, and more fiery, and, let me add, more manly, in your attack, place the offending treatise at the front of the accusation, scorning, as it seems, the baseness of damning through it, in a reviewer's disguise, the character of another work. You then state the case "by which I seem to have descended to unworthy means for the attainment of an ephemeral reputation," and lose no time in heaping characteristic abuse upon the seeming culprit.

It appears that you have compared the Analysis of my Memoir, published in the "Comptes Rendus" of the Academy of Sciences, (No. 25, Dec. 16, 1839,) with "the substance of Mr. Nasmyth's paper to be found in the "Athenæum" (Sept. 14, 1839,) and the "Literary Gazette," (Sept. 21, 1839,) and that you thence derive evidence "which seems to justify a charge of very gross plagiarism on the part of Mr. Owen," of certain "very ingenious and *novel* ideas respecting the organic structure of teeth, and their mode of development," published more than three months before my memoir appeared.

The first piece of evidence is the following quotation from the commencing paragraph of my memoir, "that all recent authors, including Cuvier, De Blainville, and even Müller, have described the teeth as *unorganised* bodies, formed like the hair and nails, by successive exudations from the external surface of the pulp," l. c., p. 784: and, finding the following passage in Mr. Nasmyth's memoir of August, you quote it to prove the absence of originality in my opening observation:—"The inter-fibrous substance of the teeth," he said, "had been improperly described, by modern anatomists, as presenting no traces of peculiar conformation. But his researches had led him to the conviction that it is not only *organised*, but so differently and characteristically so, in different animals, as to be capable of affording valuable aid to the naturalists in classifying the animal kingdom."—*Lit. Gaz.*, l. c., p. 601.

My answer to this is, that you begin with a false quotation, and one which is necessarily so in respect of the end for which it is made. If you had correctly quoted the commencing paragraph of my memoir,* your readers would have seen that I there used the word "inorganic" not in the sense of a part being devoid of a certain structure—no matter whether cellular, tubular, or fibrous,—but in the sense in which the word is commonly used by the physiologists of Germany, and of the Academy which I was addressing; viz., as signifying that a part is developed by layers, evolved from or deposited on the surface of a formative pulp, with which they are in opposition merely, not organically connected, and that the so formed part is incapable of growth and reparation. For,—after having cited Purkinje, who had discovered the fibrous texture of the teeth, and Müller who had proved the fibres to be tubes, and Retzius, who had discovered the cellular structure of the interfibrous substance,—to have aimed at representing these authors as ignorant of the organised nature of the teeth, in the sense you use the word, would not only have been flagrantly unjust, but manifestly absurd. That man, Sir, is the "unblushing plunderer," who, since the publication of Retzius' memoir, and acquainted with its contents, represents modern anatomists as ignorant of the conformation of the inter-tubular substance,† and who supposing a cellular structure to prove organisation, assumes to himself the credit of the discovery. It is singular, that by a similar mutilated quotation from my memoir, and by the same ignorant or wilful misinterpretation of the

* "The latest authors who have written on the nature and development of teeth, and who have enunciated in general propositions the results of their observations on these organs in fishes, reptiles, and mammalia, have described them as bodies of an inorganic nature, growing, like brute bodies, by the juxta-position of layers successively exuded by a glandular pulp or membrane. Such is the theory proposed by Cuvier, (Leçons, d'Anat. Comparée, 2nd Edition, tom. iv., p. 197.) and still more recently by M. de Blainville in his magnificent 'Osteographie' (p. 14 and 15), and even Müller, though admitting the more complicated nature of the dental substance as demonstrated by the researches of Purkinje, Fraenkelius, and Retzius, nevertheless regards the teeth as being developed, like the hairs and nails, by layers successively exuded from the surface of the pulp, between which and the tooth he denies that there exists any organic connection."—*Comptes Rendus*, l. c., p. 784.

† The English reader is requested to turn to p. 427 of Part I. of Baly's Müller, 2nd Edition, where a brief notice of Retzius' discovery will be found.

sense in which I there use the word "unorganised," the readers of the "Gazette" are likewise led to imagine that I was merely repeating the statement of Mr. Nasmyth, "that the interfibrous substance had been improperly described by modern anatomists as presenting no traces of peculiar conformation," and was doing him injustice by not mentioning his (self-claimed) discovery of cells in that tissue. This coincidence in garbling, and perverting the meaning of, my text, in both "Gazette" and LANCET, for the benefit of the same individual, would lead one to suspect that the dirty work of both Journals was done by the same hand. You next proceed to quote a passage from my memoir, in which I describe, in the formative pulp of a shark's tooth, its granular or cellular structure: and if, Mr. Editor, my object had been to establish as new, and claim the discovery of that fact, I should have justly merited reprobation for concealing the names of the eminent anatomists to whom the discovery of the same structure in the teeth of *mammalia* is due. But the aim of my memoir was to demonstrate how these cells were concerned in the formation of the ivory, and especially to disprove the old doctrine that it was *evolved from*, or *deposited on* the reticular surface of the pulp, either in the form of cells, spiral fibres, or thin ossific layers. I conceived, and still maintain, that I had good evidence for showing that the surface of the pulp was not the *formative* part, but that its substance was converted into the ivory, and that the ivory so formed was not merely in apposition to the pulp's surface, but in organic connection therewith.

Now, on referring to Mr. Nasmyth's memoir "On the Cellular Structure of the Ivory," &c., read before the British Association in August last, as contained in the "Athenæum" and "Literary Gazette," I find that the passages which most clearly express his theory of the development of ivory, which you charge me with plagiarising, are the following:—"The formative surface of the pulp, which is in apposition to the ivory, and by which the latter is produced, he (Mr. Nasmyth) described as presenting a general cellular arrangement, which he denominated reticular."—*Athenæum*, l.c., p. 707. Now, how does Mr. N. describe, in August last, the mode of production of the ivory? By gradual deposit in the substance of the pulp! In accordance with my theory of the December following, or by evolution or secretion from its external reticulations? No, the "Athenæum" reports (l.c., p. 707), that "Mr. Nasmyth is of opinion that from the spirally fibrous framework of the reticulations are evolved the spiral fibres of the tooth." But it may be said that the report furnished by the author to the "Athenæum" expresses his views less clearly than the more voluminous one which he transmitted to the "Literary Gazette." Granted. But I have searched both Reports, in vain, to find the slightest allusion to my theory of the development of ivory by a gradual centripetal deposit in pre-existing and pre-arranged cells in the substance of the pulp. Mr. Nasmyth describes himself in the "Literary Gazette" as approaching this subject with a diffidence becoming the imperfection of his researches ("Lit. Gaz." l.c., p. 597), and then proceeds (p. 598) to state, that "a comparison between the superincumbent perfect ivory and the formative surface of the pulp beneath is always easy," for "when merely a thin layer of ossific matter has been deposited on its surface, it may, with great facility, be drawn off entire. On the surface of the pulp, he observed, are found innumerable detached cells, with central points." These detached excreted cells are the only ones described by Mr. Nasmyth to be concerned in the formation of ivory; and the foregoing are the passages which, in justice to Mr. N., if not to myself, you ought to have quoted in illustration of his notions of dental development in August last. But that would not have served the purpose of establishing a seeming plagiarism on my part of these notions. To prove the correspondence between my theory and them, "or, the correspondence between the cellules of the pulp and the calciferous tubes of the tooth," you quote the following passage:—

"It appeared to him (Mr. N.) that the framework of the reticulations, or cellules of the pulp, constitute the fibres of the tooth; at all events, the diameter of the fibres of the reticulations is precisely that of the fibres of the ivory; the points, or projections, rising from the framework correspond to the centres of the cells, and may be traced to belong to their structure."

The passage in which I speak of "the correspondence between the granules or cells," and the "tubes calcigères de la dent future" (LANCET, p. 377), you do not quote; your readers are left to infer that it was plagiarised from Mr. N.'s; it is as follows:

"The unossified pulp consists of semi-opaque polyhedral granules or cells, suspended in a clear *matrix*, and the whole is inclosed in a tough transparent membrane, which forms the outer surface of the pulp. Beneath this membrane, at the crenate margins, the granules or cells are arranged in lines, precisely corresponding with those of the subsequent calcigerous tubes."—*Comptes Rendus*, l.c., p. 786.

Both the above-cited passages, doubtless, treat of a correspondence; but neither the things compared nor the correspondence to be elucidated by the comparison, are the same. In the one passage a correspondence of direction is enunciated; in the other, a correspondence of diameter. The part compared by Mr. N. with the calcigerous tubes

or fibres of the ivory, *is the framework of the superficial reticulations of the pulp*. The objects I speak of, in respect of their correspondence with, and relation to the formation of, the calcigerous tubes, are *the cells of the pulp's substance, beneath its superficial membrane*. It may be true that Mr. Nasmyth, in the objects which he compares, speaks of a correspondence both of diameter and direction in the "Transact. of the Brit. Assoc." vol. viii.; but no such comparison appears in the abstracts you charge me with plagiarising. If the ivory were deposited in thin ossific layers on the formative surface of the pulp, then any characteristic modification of that surface, reticular or cellular, might be said to be due to the superincumbent ivory in apposition thereto. It is consistent with this idea to state, "that the framework of the reticulations, or cellules of the pulp, *is constituted by* the fibres of the tooth."—(See "Lit. Gaz.," p. 598, the same passage which you falsely quote, LANCET, p. 378.) But suppose it should be proved, as in my memoir, that the ivory was the result of calcification, according to peculiar laws, of the substance of the pulp; then, instead of describing the superficial reticulations as *being constituted by the dental fibres*, the more accurate expression would be that the *reticulations constituted the fibres*. When your readers have compared the passage quoted from "Lit. Gaz.," l. c., p. 598, in THE LANCET, p. 378, with the original, they may, perhaps, be disposed to ask the reason of an alteration, which, though apparently trifling, makes an important difference in Mr. N.'s meaning. But, as if you had misgivings of the effect of the passage, even when garbled to suit your ends, you corroborate it with an improved version of the same from "Transact. of the Brit. Assoc." vol. viii. How many of your readers will you succeed in deceiving into the belief that such a work is in existence? If any doubt, let them inquire at Messrs. Taylor, printers, or of the Secretary of the Brit. Association; and if they feel surprise at the audacity of the quotation, let them conceive what mine must have been, to find a non-entity quoted from to brand me plagiarist.

You next proceed to show, that I have not only borrowed my theory of Dental Development from Mr. Nasmyth's memoir of August last, but the very language in which it is enunciated. Now, this is a cruel imputation; for, with the highest esteem for Mr. N.'s zealous and industrious inquiries into dental anatomy—to which it will afford me much pleasure, in the proper place, to render such justice as must satisfy his most admiring friend—I am compelled to confess that, as regards the phraseology in which he narrates them, no cephalopod ever more completely obscured itself by the diffusion of its ink, than does Mr. Nasmyth his meaning by a like process.

However, as here again you club quotations, and garble them to prove your assertion, I must again pursue your devious track.

The original passage which you translate from the "Comptes Rendus," l. c., p. 786, is as follows:—"La formation de la dent commence par le dépôt de particules terreuses dans la membrane coriace externe du bulbe. Je n'ai pas réussi à saisir l'arrangement distinct du sel qui se dépose dans cette membrane; il est transparent, extrêmement dense, et il constitue l'envelope polie emaillé de la dent." Of which passage, the literal translation I take to be is, "The formation of the tooth commences by the deposition of earthy particles in the tough external membrane of the pulp; I have been unable to recognise the precise arrangement of the hardening salts in this layer." The passage from which I am accused with having borrowed my phrase is, "The manner in which the osseous matter is deposited in the cells of the interfibrous substance he (Mr. Nasmyth) had not been able to discover."

Your readers will perceive that I confess inability to discover—not the mode in which the salt is deposited, but the form in which it is arranged; and *that*, not in the interfibrous substance, but in the outer enamel-like layer, which invests the so-called "interfibrous substance and fibres" of the tooth which I was describing.

'Tis singular, that in both series of juxtaposed quotations, selected with the sharp-sightedness of animosity, bent on damaging my character, and parallelised by the most dishonest garbling and mutilation, there should be neither agreement of subject nor predicate. *You were not wont, Mr. Editor, so to bungle in attaining a disgraceful end.*

Finally, you quote a passage, the only one which, if it existed in Mr. N.'s memoir of August last, and I had known it, would have proved me a plagiarist. I have searched for that passage in vain in the published records of the memoir in question, and if your readers make a similar search, they will find it diametrically opposed to the theory of dental development set forth by Mr. N. in the "Athenæum" and "Literary Gazette." Why, "nothing should be clearer now than that the ivory is not a secretion from the pulp, but *an organic deposition of ossific matter in the pre-existing cells* of the pulp," your readers will learn, by reference to my memoir in the "Comptes Rendus," from which, I presume, you quote the statement. But, as some may imagine it to have found its way into the memoir in the 8th volume of the "Transactions of the British Association," I subjoin a letter to the Secretary of that Association, which may enlighten your readers as to the mystery of that memoir and volume:—

"Sir:—It has been more than once objected to the publications of the British Association, that the communications, of which abstracts are given in the annual volume of 'Transactions,' are not always remarkable for their novelty, nay, that sometimes injustice has been done to able foreign scavans, by the silence with which their discoveries, broached at our sections as novelties, are passed over. I do not write to call your attention on this account to Mr. Nasmyth's memoir on the Cellular Structure of the Ivory, Enamel, and Pulp of the Teeth, communicated to the Medical Section (Aug. 29, 1839), but, pray compare what he now proposes to print in the forthcoming volume of the 'Transactions,' as the memoir communicated by him in August last, with the abstracts of that memoir printed in the 'Athenæum' (No. 620, Sept. 14th, 1839) and 'Literary Gazette' (Sept. 21st, 1839). I was, unfortunately, unable, as you are aware, to attend the Medical Section when the paper was read, and am, therefore, acquainted with the discoveries and opinions it contained only by the abstracts above quoted.

"I subsequently, as you are aware, communicated to the French Institute a memoir on the Development of Teeth, of which an abstract was published in the 'Comptes Rendus' for December 16, 1839, and a succeeding number. I have been charged by the Editors of the 'Medical Gazette' and LANCET with having plagiarised my theory of Dental Development; and the facts on which it rests, from Mr. Nasmyth's memoir, read at Birmingham in August last; and this accusation, besides deriving plausibility from the stale trick of passages parallelised by means of mutilation, is likewise and mainly supported by quotations from Mr. Nasmyth's memoir in the 8th volume of the 'Transactions of the British Association!'

"I would suggest, that when an author has not, at the period of reading his memoir at a sectional meeting, deposited the same, as read, in the archives of the Association, the Secretary should exercise a discretional power with respect to the admittance into the 'Transactions' of a memoir or abstract, which may differ materially from the original communication, or its abstract, as printed in the 'Athenæum,' 'Literary Gazette,' or other journals which report the proceedings of the Association. Otherwise a grievous injustice may be done to other inquirers, whose works may appear between the periods of the meeting of the British Association, and of the publication of the volume of the 'Transactions' of that meeting by an apparent anticipation of their discoveries; and an envious or malicious person may add to that injustice a plausible but false accusation of plagiarism.

"I have not seen the memoir or abstract which Mr. Nasmyth has transmitted for publication in the forthcoming volume of the 'Transactions;' but the attack to which I have alluded, and the mode in which it is supported, lead me to anticipate a difference between it and his memoir of August, which, while doubtless originating in a natural desire on the part of the author to render his memoir, as printed in the forthcoming 'Transactions,' not behind the present state of science, has given occasion to its being made an instrument of attack on the real author of its improved condition.

"To defend myself, therefore, from the imputations of the editors of the London weekly medical journals, I am obliged to request that you will direct Messrs. Taylor to send to me a proof of Mr. Nasmyth's memoir, as now prepared for publication, in order that I may be able to point out the interpolations, additions, or omissions, which may convert the differences between Mr. Nasmyth's August communication and my December memoir into correspondencies.

"To give you an idea how easily, though, doubtless, unintentionally, on Mr. N.'s part, this may be effected, I shall observe, that my observations on Dental Development, and the theory founded thereon, while they indicated the amount of analogy, and the characteristic differences between the modes of formation of ivory and bone, were subversive of the prevalent doctrine that the ossific matter of the tooth was deposited in thin layers, or otherwise, on the surface of the pulp,—a doctrine based upon the well-known facility with which these layers can be detached. Indeed, I expressly deny that the surface of the pulp is formative in the sense of producing the ivory, which is in apposition to it; for I demonstrate that the ivory is not merely in apposition to, but in organic connection with, the pulp. Pray, observe, therefore, whether Mr. Nasmyth retains in his memoir (quoted by my accusers from the 'Transact. of the Brit. Assoc.,' vol. viii.) the following passages, which you will find in the abstracts thereof furnished by the author to the 'Literary Gazette' (Sept. 21, 1839) and 'Athenæum' (Sept. 14, 1839).

"When merely a thin layer of ossific matter has been deposited on its (the pulp's) surface, it may, with great facility, be drawn off entire.—*Lit. Gazette*, p. 598. 'The formative surface of the pulp, which is in apposition to the ivory, and by which the latter is produced, he described as presenting a general cellular arrangement, which he denominated reticular, resembling a series of skeletons of a dessicated leaf.'—*Athenæum*, p. 707. It might be contended that the mode of production here meant by Mr. Nasmyth was that which I subsequently described in December, viz., by conversion of the pre-existing cells into the *substance of the pulp*, instead of by evolution from its reticular surface. See, therefore, whether

he still retains the following statement, which expresses his notion in August last of the mode of formation in question:—'Mr. Nasmyth is of opinion that, from the spirally fibrous framework of the reticulations are evolved the spiral fibres of the tooth.'—*Athen.*, p. 707. Again, if the passage—'A comparison between the superincumbent perfect ivory and the formative surface of the pulp beneath is always easy,' *Lit. Gaz*, p. 599, be retained in the memoir as it is about to appear, observe whether the word *formative*, as applied to the surface of the pulp, be now omitted in that passage; because, in order to make Mr. N.'s memoir on the Cellular Structure of the Teeth, as read in August last, consistent, as regards the theory of the formation of ivory, both with mine on the Development of Teeth, as published in December last, as well as with itself, as improved by the new paragraphs quoted by my accusers to support their charge of plagiarism,—the statements in the original memoir, to which I have drawn your attention, upholding the old doctrine of dental development by thin layers of ossific matter successively evolved from, or deposited on, the formative surface of the pulp, and those other statements which expressly deny, or imply the negation of, the formation of the ivory by ossification of the pulp; and, indeed, the whole, or nearly the whole, of the speculations on dental development, contained in the first and second columns of the 'Lit. Gaz.,' p. 598, must be omitted, and other statements substituted. Not, however, to tax your patience with more of these physiological subtleties, I shall simply state, that the aim of my researches, communicated to the Institute, was so far different from those I am accused of plagiarising, that whereas it was neither to controvert nor to confirm the cellular structure of the ivory, as described by Retzius,* it bore directly on the establishment of a true theory of the mode of formation of the ivory, which my observations enabled me to propose with confidence. Now, the main object of Mr. Nasmyth's investigations on the microscopic structure of the teeth, communicated to the British Association in August last, was to prove the cellular structure of the ivory: with regard to its mode of development he expressly states, 'that the researches which he has made on this point are as yet imperfect.'—*Lit. Gaz.*, Sept. 21, p. 597. And the 'Athenæum' reports, 'that with respect to the formation of the ivory, Mr. Nasmyth stated, that he was not prepared with a satisfactory theory.'—No. 620, Sept. 14, 1839. It is in accordance with these admissions, and with the evidence of Mr. Nasmyth's leaning to the old doctrine of the deposition of the ivory in thin ossific layers upon the formative surface of the pulp, contained in the passages which, I presume, may be possibly omitted in his forthcoming memoir, that the accomplished translator of 'Müller's Physiologie' (loc. cit., p. 431), when he states that 'the observations of Purkinje, Raschkow, and Schwann, respecting the mode of formation of the proper dental substance, have not yet completely elucidated the subject,' does not refer to any subsequent discovery in Mr. Nasmyth's communication to the British Association in Aug., 1839, tending to further elucidate the formation of the dentine; whereas that communication, if it had anticipated, as the editions of the 'Gazette' and LANCET affirm, all that I claim as original in my December memoir would, unquestionably, have afforded additional, if not complete, elucidation of the nature of that interesting process."

And here, Mr. Editor, allow me to suggest to such of your readers as may not be disposed, either through your or my recommendation, to compare the abstract of my memoir in "Comptes Rendus" with that of Mr. Nasmyth in the "Athenæum" and "Literary Gazette," in quest of scientific analogies or otherwise, to turn to Part I. of Dr. Baly's Müller, pp. 427-31, published in October, 1839. This excellent work, I presume to be in the library of most, if not all, of your readers; and, with the evidence they will there find of the disposition on the part of the learned transla-

* "M. Retzius has discovered that the tubes, in their course from the cavity of the tooth to the external surface of the ivory, branch by dichotomous division, and give off numerous side twigs which ramify in the intertubular spaces. Some of these twigs terminate in small cells filled with calcareous matter, and very similar to the corpuscles of bone. In the human teeth these cells are very minute, and difficult to discover, but they are distinct in many mammalia, as, for example, in the horse (*fig.* 41).—*Baly's Translation of Müller's Physiology*, 2nd Edition, Part I., p. 427. Dr. Baly adds:—'In the Report of the meeting of the British Association in the 'Athenæum,' No. 620, Mr. Nasmyth is represented as stating that the intertubular substance of the ivory is not structureless, but distinctly cellular.' And he might have added, that Mr. Nasmyth, instead of citing Retzius's beautiful observations, anticipating his alleged discovery, likewise asserted that 'the interfibrous substance of teeth had been improperly described, by modern anatomists, as presenting no traces of peculiar conformation.'—*Lit. Gazette*, p. 601.

"If this statement, Mr. Secretary, be retained in the account of the alleged discovery of the cellular structure of the intertubular substance, transmitted for publication in the forthcoming volume, it ought, in justice to Retzius, to be omitted."

tor to do justice to the discoveries of his countryman, I would ask, if they can conceive it possible that Dr. Baly would omit all notice of the laborious and ingenious microscopic observations of the apt selection of appropriate subjects for yielding the required results, which convert a previous probability of the development of ivory by intus-susception, or conversion of pre-existing pulp-cells into certainty? And that he should have passed over in silence a theory, which while it enunciates the resemblance between dentification and ossification, at the same time defines the nature and amount of the differences between these processes. Yet such must have been the flagrant injustice committed by Dr. Baly on Mr. Nasmyth, if the memoir from which the translator of Müller quotes Mr. N.'s alleged discovery of the cellular structure of the intertubular substance of the ivory, likewise "contained," as you assert, "every fact which Mr. Owen announced to the Institute of France as his own discovery;" or anticipated, as your brother editor of the "Gazette" affirms, "all that Mr. Owen claims as original."—That Mr. Nasmyth's memoir, when it is published, may contain any or every discovery in dental anatomy which I have made, and made public, would not at all surprise me.

But to return to the letter by which I trust to prevent this being done without acknowledgment:—"Since, however, the editors of the 'Medical Gazette' and LANCET avail themselves of the version of Mr. Nasmyth's memoir of August last, as it is designed to appear in the eighth volume of the 'Transactions of the British Association,' nay, even quote it, to brand me a plagiarist, as if such a work were in existence, it seems to me to be not an unreasonable request, that you will restore in the memoir, of which you superintend the publication, those passages, the omission of which would enable the editors of THE LANCET and 'Gazette' to give a colour to their accusation. But, as you may anticipate some interpolations as well as omissions in the memoir in question, are necessary to establish the alleged conformity between it and mine. Take a sample: Mr. Nasmyth is reported in the 'Literary Gazette' (loc. cit., p. 598,) to have said in August last, 'Schwann regards the dental substance as the ossified pulp; whilst Mr. Nasmyth's observations lead him to conclude that the cells of the ivory are altogether a distinct formation.' He describes them, in fact, as being detached cells on the surface of the pulp.—*Lit. Gaz.* loc. cit. p. 598.

"The observations, subsequently published by me, have, I believe, fully established that which Schwann's researches left as a matter of probability only, and which Mr. Nasmyth's observations, up to August last, lead him to deny. But the editor of the 'Medical Gazette,' to prove the theft for which I should have richly merited the characteristic and severe castigation of his brother editor of THE LANCET upon the hypothetical plagiarist, quotes the following passage from the memoir:—'In Mr. N.'s own report, given in the 'Transactions of the Association,' which has been printed separately, and a copy of which is now before us, we find it stated that the ivory is neither more nor less than the ossified pulp, and that it can in no wise be regarded as an unorganised body.'—*Med. Gaz.*, No. 37, p. 439.

"The reader is left to draw one inference from this statement, which I wish for your sake were true, viz., that a copy of the 'Transactions of the Association,' vol. viii., were in anybody's hands; but I fear that some time must still elapse before you can have the pleasure of announcing its publication. I am, &c. &c.

"RICHARD OWEN."

"To Professor Phillips, F.G.S., Sec. British Association, &c. &c.
London, June 10, 1840."

A parting word, Mr. Editor, in explanation of my offence of "exporting beyond seas my discoveries," &c. So far as regards those to which I lay claim in my memoir, of which an abstract was published in the "Comptes Rendus" for Dec. 16, and a succeeding number, I have to observe, that they were communicated, in the first place, to those of my countrymen, whom I shall always regard as having the first claim to any addition to physiological science which it may be in my power to make. The theory of dental development propounded, and supported by the researches described in my memoir (l. c.), were first submitted to the members of the Royal College of Surgeons in my lectures on the teeth, delivered in May, 1839.

In the first part of the "Osteographie" of M. de Blainville, subsequently published, I found the dental bone described (p. 14) as follows:—"The anatomical structure of ivory (phaneros) differs still more than its chemical composition from that of bone. In fact, instead of being formed of the same cellulo-gelatinous or cartilaginous basis, in the meshes of which is deposited the solidifying calcareous material, itself forming a net-work more or less close, and containing the medullary juices, the ivory (phaneros) is composed of extremely thin conical plates, successively applied to one another (s'emboitant les uns les autres), and united together so closely and completely, as to constitute a compact homogeneous whole.—It (*phaneros*) is a dead part exhaled from the surface of a formative pulp.—Now, by the production of the ivory solely by layers applied successively within one another,

upon the productive pulp, itself the only living part,—the only part connected by the vascular system and by the nervous system with the rest of the organism,—this pulp diminishes in volume as the productive power decreases; so that the period at length arrives when the component cones of the ivory likewise begin to diminish, &c." —pp. 14, 15.

This description of the dental bone, in 1839, implying such unaccountable oversight of the labours of Purkinje, Müller, and Retzius, was judiciously omitted by Dr. Knox in the able translation of M. de Blainville's work, for which your readers are indebted to that anatomist.

But, when this description is offered to the French Academy as "complète dans l'état actuel de la science, (see "*Note lue par* M. DE BLAINVILLE, *en presentant son Ouvrage sur l'Osteologie des Animaux Vertebrés*," 'Comptes Rendus,' 1839, p. 782,) the correspondent of that Academy would be wanting in his duty if he neglected to lay before it proofs of a mode of formation of the teeth diametrically opposed to that described by M. de Blainville, or who omitted to call the attention of his fellow-member to the works of those anatomists in which the doctrine of the lamellated structure of ivory had been completely refuted. I am, Sir, your obedient servant,

RICHARD OWEN.

London, June 13, 1840.

*** We have but a single remark to make on the foregoing letter of Mr. Owen. We received for review a copy of the "Comptes Rendus" on the one hand, and the "Athenæum," "Literary Gazette," and a printed extract from the 8th vol. of the "Transactions of the British Association," on the other. The latter was marked on the title-page, "*Extract from the 8th vol. of the Transactions of the Association;*" and we should never have alluded to it in our review, had we entertained the most remote idea that the eighth volume of the "Transactions of the Association" had not yet been published. With this explanation we leave Mr. Owen's letter to Mr. Nasmyth, whose business it now is to explain and justify his own views of dental development.

PROVINCIAL MEDICAL ASSOCIATION.

The eighth anniversary meeting of the Provincial Medical and Surgical Association will be held at Southampton, on Wednesday and Thursday, 22nd and 23d July next. The first general meeting will be held at the Audit-house, July 22; and the president, Dr. Jeffreys, of Liverpool, will resign the chair at half-past two p.m., to Dr. Steed, the president-elect.

The Analysis and Medicated Properties of the Tepid Springs of Buxton. By Sir CHARLES SCUDAMORE, M. D., &c. Third Edition.

THIS work being framed for superficial readers, was not destined for the inspection of well educated men (at least so we presume). But as it purports to be the production of a physician, it ought to be subjected to the ordeal of medical criticism. It contains seventy-eight pages. The first twenty are devoted to a geological and chemical description of the Buxton tepid springs; for which we are informed, *in a note*, that the author is indebted to Mr. Webster, the geological lecturer, and to Mr. Garden, the druggist, of Oxford-street: an obligation which is thus modestly expressed, as regards the chemical department—"In *my* analysis I received the valuable assistance of Mr. Garden."

The plain facts respecting the springs of Buxton are these:—they are situated in what is termed the mountain limestone formation; a geological deposit, of a dark colour, generally containing numerous fossils and carbonaceous matter upon which the coal-beds rest. The water "rises freely, by numerous fissures, through the limestone," and at this point possesses a temperature of 82°. It is then artificially conducted into a large marble basin, termed St. Ann's Well, where its temperature is 77°. The mean temperature of common spring water, in the same latitude, and at the same altitude, will probably be about 50°. Hence the Buxton spring water has a temperature nearly equal to that of the New River water at London in summer. So far, then, as temperature is concerned, the latter is equal to the Buxton spring water, so much lauded in this production. The next inquiry is, Does the water possess any chemical constituents which can act efficaciously on the human body when plunged therein? According to Mr. Garden, the solid contents of the Buxton water are as follows, in an imperial gallon:—

Muriate of magnesia.....	.58 grs.
——— soda	2.40
Sulphate of lime	.60
Carbonate of lime	10.40
Extractive matter and a minute quantity of vegetable fibres..	.50
Loss	.52
	15.00

And its gaseous contents—

Carbonic acid	1.50 cubic inch.
Azote	4.64
	6.14

We took the trouble to examine a specimen of New River water sent to us from the point where the New River disappears from public view at Sadler's Wells Theatre. The solid contents in the gallon we found to amount to 15.06 grains, or rather more than that contained in Buxton water. The insoluble matter, in dilute acid, consisting of sulphate of lime and dissolved animal and vegetable matter, amounted to 2.46 grains, or rather more than is contained in Buxton water. The other solid constituents were similar. The gaseous matters present appeared to be common air and a little carbonic acid; both of which exist in a greater or smaller proportion in nearly all kinds of water. It deserves remark, that Buxton water, that of the New River and of the Thames, contains nearly the same quantity of solid ingredients. Mr. Garden found that of the Thames to contain in the gallon—

Muriate of magnesia.....	0.28
——— soda	1.40
Sulphate of lime	1.44
Carbonate of lime	11.80
Silica and carbonaceous matter	0.30
	14.22
Loss	.28
	14.5

The author quotes this analysis, but does not allude to any gaseous substances as existing in the water, which undoubtedly do occur. The author attributes a great many virtues to the presence of nitrogen, or azote, in the water. But all water would appear to contain a much greater quantity of azote, in proportion to the oxygen, than exists in common air. Common air is generally viewed as formed of 79 nitrogen and 21 oxygen. But Dr. Thomas Thomson has shown that 100 volumes of air, when absorbed by the water of the Clyde, and then extricated by boiling, yielded

45.39 azote, or nitrogen.
18.63 oxygen.

Hence it is easy to account for the presence of azote and the absence of oxygen in the Buxton water, if we conceive that a small portion of oxygen has been taken up by some oxydising body; carbon, for instance, to form carbonic acid. But Sir Charles Scudamore "must consider that the azotic gas is the only constituent in the water to which a positive medical property can be fairly allowed; but that this is energetic," he says, "I am well persuaded; the *action of the water on the kidneys is sufficiently remarkable, and, in general, is promptly shown.*" (!!) We suppose, upon the *vice versâ* principle, by which men drink in warm weather, that when there is so much out-going there must be a proportionate incoming; for it is quite clear that if a gallon of water be placed in a cask, more will escape by the spigot when it is opened, than if only half a gallon had been deposited in the reservoir. The author has, therefore, afforded us a fine illustration of this important principle.

We have shown pretty clearly that Buxton spring water, and the water of that filthy ditch, the New River, are nearly identical; it is, therefore, amusing to read the following observations:—

"In delicate cases of dyspepsia the good effects on the stomach (internally) are often experienced very quickly, and shown in the improvement of the appetite and digestion; I view the remedy altogether as a very useful stimulant, aqueous diluent, and always admissible, unless the inflammatory diathesis be present, (!) or a plethoric state of vessels forbidding any physical cause of excitement."

If pure water be a stimulant, mankind must be dreaming—not a soul of his species can be alive. Shades of ancient philosophy arise, and enjoy your victory! An immortal Scudamore, M.D., of the nineteenth century, has superseded the old axiom, "Cogito, ergo sum," by "aquam bibo, ergo, non sum."

The author's directions for drinking spring water.—"The first dose of the water should be taken before breakfast, so as to leave an interval of half an hour." This reminds us of the classical physicians who recommended for stone to take a pint of urine in the morning fasting.

"At the commencement half a pint may be mentioned as the total daily quantity taken at twice; the second quarter of a pint at one or two, or other hour if more convenient; a reference being had to the period of taking meals.

"It is to be considered that this water does not quit the stomach so quickly as saline aperient waters, or those highly carbonated; and, therefore, if a large quantity be taken at once, a sense of oppression is

felt, and very probably of fulness of the head with giddiness, and attendant flushing. The utmost total quantity per diem that I have seen useful has been a pint and a half, and a pint is the average. As the full doses are used, it will often be expedient to visit the well thrice instead of twice for the purpose. I am sure of the advantage of not drinking much at once. Those can drink the largest quantity without the inconveniences I have mentioned, upon whom the water exerts an active diuretic effect."

This affords a second illustration of the marvellous principle, that "great out-goings admit of great in-pourings." The wine merchants must find that the doctor is a tee-total water-drinker. Be that as it may, he is certainly a *pure water doctor*, and deserves some credit for the admission.

"With respect to the diuretic property of the water, its effects are found very useful in the painful complaints of the kidneys and bladder arising from gravel; and in this class of cases it may be used advantageously with more freedom than in any other."

Upon the principle, we suppose, that if a large portion of fluid be mixed with a small quantity of solids, there will be more of the former than the latter. We confess we cannot recur at present to any more profound doctrine which shall explain why water—pure water alone—should cure gravel.

"The same remark," the author proceeds to say, "also applies to those instances of indigestion; and of which gouty persons are so frequently the example, where the lateritious sediment in the urine is abundantly found."

The author is aware that "many persons speak of this water as being too simple in its composition, too much like common water, to deserve any reliance upon it as a medicine." *Lucus a non lucendo.* For the same reason he exclaims, "Do I think favourably of its qualities." It is obviously difficult to reason with the author, because he sees clearly through a millstone, which we positively cannot.

But according to our author, the pure water acts like a washerwoman on the stomach. The aqueous *dejeuner* which he prescribes, affords a Lilliputian illustration of the Augean stable purification, for "in diluting and assisting towards the removal of any acrimonious secretions which are delayed in the stomach and duodenum, this aqueous diluent may have much more useful effect than may at first sight (the millstone again!) be imagined, particularly by those who see a remedy only in what is very potent in its nature and composition."

New Discovery—Azotic Gas, or Nitrogen, bad for the Stomach.—"If used fresh from the pump, it will contain a small portion of azotic gas in solution, and, therefore, as a beverage, to be freely drunk in its natural state is not to be recommended."

Let us see how this observation bears the test of figures; for medical men will find numbers to be the proper agents for testing the asseverations of mere theorists. Now, Buxton water contains, in the gallon, 4.64 cubic inches of azote; and 100 cubic inches of water, from the river Clyde, afforded 3.113 cubic inches of air. But a gallon contains 277.27 cubic inches of water; the air, therefore, contained in this bulk will be 8.63 cubic inches: 100 volumes of this air were found to consist of 70.9 azote and 29.1 oxygen. Following the same proportion, we have 100 : 70.9 :: 8.63 : 6.118 cubic inches = the amount of azote in a gallon of Clyde water. If we now subtract the Buxton azote from the Clyde gas—

6.118
4.64
1.478

we shall find that there is nearly 1½ cubic inches in the Clyde water more than in that of Buxton; and, although we have no data at present for making the statement, we think there will be little doubt that spring water, which has not been exposed to the air, or to heat, will, in general, contain more than that proportion. It might be asserted, that in Clyde water the azote exists in the form of common air; but the analysis shows that it is not present in the proper proportion for that purpose. Besides, common air is a mixture, both gases acting independently of each other. Perhaps the author would say that the azotised water causes the fever of Glasgow. But, according to his own principles, it ought to cure putrid fever by its inflammatory stimulus. The Clyde water is used for all purposes by the inhabitants of Glasgow.

To show the innoxious effect of azote upon the system, we may refer to the anecdote related by the celebrated John Ray, in his "Travels to Venice," in 1663:—"A nobleman," says he, "of this city showed us a boy who had a faculty of charging his belly with wind (oxygen and azote), and dis-

charging it again, backward, at pleasure, which we saw him perform. When he charged himself, he lay upon his hands and knees, and put his head on the ground, almost between his legs." It is curious that this position is nearly that recommended by our author in bathing at Buxton, as will immediately appear.

The author gives very particular directions for bathing, with respect to the particular kinds of diseases. It is a grand thing, as his contemporary, Whitlaw, would say, for gout, rheumatism, and paralysis. The author directs the bather to go plump into the bath, and endeavour, as quickly as possible, without dilly-dallying, to fall flat on his face. You must not dive with the head downwards, for "the gravitation of the blood in this mode might create serious mischief." Some persons recommend wetting the head first, because, the heart, being a forcing-pump, might project an undue quantity of blood to the head; but, if you effuse water over the head first, just as old women prevent the water in a tea-kettle, over a smoky fire, from being tainted, by sprinkling a little common salt over the lid, you obviate "the unfavourable determination of blood to the vessels of the brain. With gentlemen," he adds, "a bathing-cap is never necessary, in these days of little hair without powder." So minute is our author. "But ladies would be seriously inconvenienced by not being allowed the use of a bathing-cap."

People have hitherto thought that there could scarcely ever be any harm in washing or cleansing the body with pure tepid water, but the worthy author shows that this is no small mistake. A lady complained of indigestion, headach, much weariness, and great irregularity of the circulation. She made trial of the natural bath (77°?). "Immediately, on immersing herself, she felt a sense of rushing of blood to the head, with pain and confusion, and thought she should faint in the bath. The head and feet remained singularly cold for some time." It is questionable whether any one but the author would have been much alarmed at these effects.

The work concludes with a bundle of similar cases. If it have reached a third edition without an exposition of the gross fallacies with which it is replete, its obscurity may be thanked for its salvation. The ill consequences to the good name of science, producible by an *ad captandum* work of this nature, being palmed upon the public as the production of a member of an English College of Physicians; and of the opinion which every thinking man must form of the character of our medical institutions, which ranks among its members worthy individuals who are ignorant of the first principles of chemical physiology. We undervalue not the benefits that may accrue to invalids from temperance, exercise, and the alteration of bad habits, during their residence at watering-places, but object to the apparent use, but in reality the abuse, of science, to prove, for selfish motives, that the effect depends upon the author of such works practising, at Buxton in "the season," upon the nature of the water which is drunk, or bathed in, and not upon the circumstances, which are quite obvious to every man of common sense.

LECTURERS' FEES.—We recently received a letter for publication, containing the following statement:—The validity of a verbal agreement between a medical pupil and his tutor, not having hitherto suffered the ordeal of a court of law, I determined, on public grounds, in May, to put it to that trial. I had paid three guineas to Mr. Pereira (a lecturer on chemistry at a school near the Post-office, St. Martin's-le-Grand,) for entrance to a course of lectures on chemistry, on these terms; namely, that in case I was required to attend all the lectures in London at his school, he would entitle me to enter my name at the Hall for registration, and thus escape the operation of the prolonged three years' study regulation, just at that time coming into operation; but in the event of my entering at the Pine-street School, Manchester, the money which I paid to Mr. Pereira was to be returned. On application for it, under the latter alternative, the lecturer lost his recollection of any thing more than a vague conversation on the subject, and kept the money, without my having for it any consideration. I refreshed his memory on the subject on Thursday, at the Court of Requests, in Kingsgate-street, when Mr. Commissioner Dubois sent the case to a higher tribunal, without prejudice to my claim, (a rare occurrence, not happening there once in seven years,) and ordering the lecturer to pay the costs. I will repeat the application next term-time, in Westminster Hall.

JOHN WILKINSON, Surgeon.

18, Upper George-street,
Bryanstone-square.

THE LORDS' VACCINATION BILL, WITH MR. WAKLEY'S AMENDMENTS.

THE following is a copy of the Vaccination Bill, as it was amended in the House of Commons on the recent discussion.

Ordered by the House of Commons to be printed, 18th June, 1840.—3 VICT.

A BILL

[*As amended by the Committee, and on Report,*]

INTITULED,

AN ACT TO EXTEND THE PRACTICE OF VACCINATION.

1. *Poor Law Guardians to contract with their Medical Officers, or with legally qualified Practitioners, for Vaccination.*

Whereas it is expedient to extend the practice of Vaccination; be it therefore enacted, by the Queen's most excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons, in this present Parliament assembled, and by the authority of the same, That from and after the passing of this Act, it shall be lawful for the guardians of every parish or union, and for the overseers of every parish in which relief to the poor shall not be administered by guardians, in England and Wales, and they are hereby directed to contract with the medical officers of their several unions or parishes respectively, or with any legally qualified medical practitioner or practitioners, for the Vaccination of all persons resident in such unions or parishes respectively: Provided always, That it shall be a condition of every such contract, that the amount of the remuneration to be received under the same shall depend on the number of persons who, not having been previously successfully vaccinated, shall be successfully vaccinated by such medical officers or practitioners respectively so contracting.

2. *Guardians to conform to the Regulations of the Poor Law Commissioners.*

And be it further enacted, That in making such arrangements as may be required for the execution of this Act, such guardians and overseers, and all other officers engaged in the administration of the laws for the relief of the poor, shall conform to the regulations which may from time to time be issued by the Poor Law Commissioners in that behalf, which regulations the said Commissioners are hereby authorised and required to make and issue.

3. *Medical Officers or Practitioners to report to the Guardians the number of Persons Vaccinated, &c.*

And be it further enacted, That such medical officers or practitioners shall make a report to such guardians or overseers from time to time of the number of persons successfully vaccinated by them respectively, and shall make such further report with respect to the persons so vaccinated, as such guardians and overseers, under the direction of the Poor Law Commissioners, shall require.

4. *Guardians to transmit a Copy of every Contract to the Poor Law Commissioners.*

And be it enacted, That such guardians or overseers shall forthwith, after the conclusion of any such contract as before mentioned, transmit a copy thereof to the Poor Law Commissioners.

5. *Contract not liable to be annulled after Fourteen Days from receipt thereof.*

And be it enacted, That if such Commissioners shall not annul such contract within fourteen days from the receipt thereof, such contract shall thenceforth not be liable to be annulled by such Commissioners.

6. *Guardians of Poor Law Unions in Ireland to divide their Unions into Districts, &c.*

And be it further enacted, That as soon as may be after the passing of this Act, the guardians of every Poor Law Union in Ireland shall (subject to the approbation of the Poor Law Commissioners) divide such Union into districts of convenient extent, and may alter the same from time to time, subject to the like approbation, and shall (subject to such approbation as aforesaid) contract with competent medical practitioners for the period of one year, and so from year to year as such contract may expire, for the Vaccination of all persons who may come to such medical persons for that purpose.

7. *Previous Provisions with respect to Unions in England and Wales to apply to Ireland.*

And be it further enacted, That all the provisions hereinbefore made with respect to England and Wales, for the appointment and giving due notice of the appointment of the places and times at which such medical officers or medical practitioners shall attend to vaccinate such persons, and for the making of reports by such medical officers or medical practitioners, shall apply to all such contracts as may be made under this Act by the guardians of any poor law union in Ireland; and such guardians, and all other officers engaged in the administration of relief to the destitute poor, shall conform to the regulations and instructions of the Poor Law Commissioners, in like manner as is hereinbefore directed with respect to guardians, overseers, and other officers in England and Wales.

8. *Any Person who shall produce, or attempt to produce, the Disease of Small-Pox by Inoculation or otherwise, to be liable to Imprisonment for Three Months.*

And be it further enacted, That any person who shall from and after the passing of this Act produce or attempt to produce in any person, by inoculation with variolous matter, or by wilful exposure to variolous matter, or to any matter, article or thing impregnated with variolous matter, or wilfully, by any other means whatsoever, produce the disease of small-pox in any person in England, Wales, or Ireland, shall be guilty of a misdemeanour, and shall be liable to be proceeded against, and convicted summarily before any two or more justices of the peace in petty sessions assembled; and for every such offence shall upon conviction be imprisoned in the common gaol or house of correction for any term not exceeding three months.

9. *Directions as to the Interpretation of Words.*

And be it further enacted, That every word in such part of this Act as refers to England and Wales shall be interpreted in like manner as such word is directed to be interpreted in an Act passed in the fourth and fifth year of his late Majesty King William the Fourth, intituled, "An Act for the Amendment and better Administration of the Laws relating to the Poor in England and Wales;" and that every word used in such part of this Act as relates to Ireland shall be interpreted in like manner as such word is directed to be interpreted in an Act passed in the first and second year of the reign of her present Majesty, intituled, "An Act for the more effectual Relief of the Destitute Poor in Ireland."

MEDICAL STATISTICS.

In a printed report of the affairs of the parish of Marylebone, there is a statistical account of the Marylebone Infirmary, by the resident house-surgeon, Dr. Boyd, which contains some particulars worthy of notice. During the last half of the year 1839, the number of patients admitted into the Infirmary amounted to 1457, and the mortality to 146.

The following table indicates the relative frequency of the different affections under which the patients laboured:—

Diseases of the digestive organs, viz., stomach, intestines, &c., 39 males, 65 fem.; respiratory organs, viz., lungs and their appendages, 89 m., 86 f.; circulatory organs, viz., heart and blood-vessels, 28 m., 30 f.; genito-urinary, viz., organs of generation, kidneys, bladder, &c., 16 m., 38 f.; locomotive organs and cellular tissue, viz, bones, muscles, &c., 99 m., 91 f.; nervous system, viz., brain, nerves, &c., 56 m., 80 f.; eye, ear, and skin, 257 m., 312 f.; diseases affecting system generally, viz., fever, &c., 59 m., 119 f.

The ages of the patients are indicated in the following table:—

Under 1 year, 50; from 1 to 2 years, 24; 2 to 3, 44; 3 to 5, 126; 5 to 10, 263; 10 to 20, 237; 20 to 30, 131; 30 to 40, 137; 40 to 50, 131; 50 to 60, 127; 60 to 70, 97; 70 to 80, 67; 80 to 90, 18; 90 and upwards, 5.

Of these there died:—

Under 1 year, 10; from 1 to 2 years, 4; 2 to 3, 1; 3 to 5, 11; 5 to 10, 3; 10 to 20, 3; 20 to 30, 14; 30 to 40, 21; 40 to 50, 18; 50 to 60, 18; 60 to 70, 19; 70 to 80, 17; 80 to 90, 4; 90 and upwards, 3.

The mortality occasioned by different diseases was very various. Thus, diseases of the respiratory organs cut off 63 patients; of the digestive, 29; of the nervous system, 20; of the circulatory, 7; skin, &c., 6; locomotive, 5; genito-urinary, 5; diseases affecting the system generally, 11. More than one-half the deaths, Dr. Boyd observes, amongst those affected by disease of the respiratory organs, was from pulmonary consumption. The mortality, also, varied greatly, according to the period of life; under the age of one year, it amounted to 20 per cent. on the admissions. Appended to the Report is a very carefully-drawn up nosological and statistical table of the mortality of the Infirmary for the year 1839; but it is of such a nature as to escape analysis.

DESCENDANTS OF DR. JENNER.

The following Petition was presented to the House of Commons on Monday last, and ordered to lie on the table, and to be printed:—

The humble Petition of Henry Jenner, Doctor of Medicine, and the Reverend George Charles Jenner, Clerk,

Sheweth,

That your Petitioners are nephews of the late Doctor Edward Jenner:

That they are of the respective ages of seventy-three and seventy-one years:

That they both very materially assisted Doctor Jenner in the investigation and the practice of Vaccination:

That they expended nearly the whole of their property in promoting the object of Doctor Jenner's discovery:

That Doctor Jenner would have been a

much richer man if he had kept Vaccination secret, and not divulged the practice of it for the benefit of mankind:

That Doctor Jenner, by his will, left Doctor Henry Jenner only an annuity of twenty-six guineas, and the Reverend George Charles Jenner a legacy of twenty pounds:

That, under these circumstances, your Petitioners humbly submit to the consideration of your honourable House their case, trusting that their services, and for the sake of the memory of a man who conferred the greatest benefit upon the human race that, under Divine Providence, was ever conferred upon it, will not be passed over.

And your Petitioners will ever pray.

HENRY JENNER.
GEORGE CHARLES JENNER.

PATHOLOGICAL MEETING.

Tuesday, June 16, 1840.

DR. CLENDINNING in the Chair.

DISEASE OF THE KIDNEY SIMULATING LUMBAR ABSCESS.

Mr. BENJAMIN PHILLIPS presented a preparation of the kidney illustrating the following case:—The patient, a man, 55 years of age, had been for many years a horse patrol; during the previous two or three years he had suffered occasionally from pain in the small of the back, which was suspected, by the surgeon in attendance, to result from disease of the kidneys; he was cupped two or three times with slight relief. When admitted into the Marylebone Infirmary the pain was still troublesome, there was little tumefaction or fluctuation, and the urine presented no remarkable change. When he had remained in the institution some weeks the disease assumed a more definite character, the pain in the loins became more severe, tumefaction and fluctuation became apparent, and lumbar abscess was suspected. It now became a question whether the tumour should be punctured, or allowed to burst; it was determined that a small puncture should be made, when a small quantity of thin, offensive, purulent fluid escaped; the puncture closed, and no constitutional irritation resulted. After some weeks a collection of fluid again took place, and made its way over the entire of the back, from the sacrum to the top of the scapula. The tumour was again punctured, and a pint and a half of the same kind of fluid, as before, removed; the puncture closed, no constitutional irritation followed, but at the expiration of ten or eleven days, there was found to be ulceration at the point where the opening had been made, from which there was a constant dripping of fluid, amounting sometimes to as much as a pint during the day. He went on in this way for nine or ten weeks, hectic coming on only during the last fourteen or fifteen days; during the whole of this period there was no remarkable change in the urine. He died from the irritation induced by the disease, which was still thought to be lumbar abscess with disease of the vertebræ.

After death, the abdomen was first laid open, and a long probe introduced into the fistulous opening in the back, just above the sacrum; the probe passed directly into the substance of the kidney, on examining which it was found to contain three or four large calculi; one of these was close to the surface of the left kidney, and had produced irritation, inflammation, and consequent suppuration in the neighbouring tissues. There was slight disease of the lumbar vertebræ near the kidney.

The case was interesting from its illustration of the difficulty of determining, during life, whether the abscess was dependent upon disease of the vertebræ or of the kidneys. The fact of the urine remaining healthy was a strong presumption in favour of the kidneys being unaffected. He was not aware of any means of diagnosis by which, in such cases, we could distinguish the exact seat of the mischief.

Dr. CLENDINNING had a curious case of disease of the kidney under his care two years since, in which he was able to determine the nature of the malady. The patient, a man, complained at first only of debility; pain in the renal region then came on, and a tumour appeared in that part. Swelling became dull on percussion, and when emaciation had proceeded to a great extent the kidney could be seen quite plainly, very much enlarged, through the integuments of the abdomen. After death the kidney was found much increased in size, and its pelvis was occupied by large calculi, which, from their irritation, had produced inflammation and suppuration of the organ.

Mr. GREGORY SMITH had seen three cases of abscess in the kidney resulting from the presence of calculi in the organ. One of these cases was that of a patient who was admitted, some years since, in a state of hectic, into St. George's Hospital. There was a large abscess pointing, and apparently about to burst in the lumbar region. Sir B. Brodie laid the abscess freely open, and on introducing his finger into the cavity, detected several loose bodies at the bottom of it; these being removed by means of a small forceps, proved to be three calculi of the size of nutmegs. The patient, a woman, lingered a short time, and sunk. The structure of the left kidney was found to be destroyed by suppuration, and there was no communication with the bladder, the ureter being impervious. In Mr. Phillips's case part of the kidney was still so far normal in structure, that it would probably perform its function. Was there any trace of purulent

deposit in the urine in this case? In another case he (Mr. Smith) recollected, in St. George's Hospital, the kidney had become enlarged to the size of a two-quart bottle, and contained a calculus which had moulded itself to the interior of the kidney. Cases of abscess pointing in the loins were interesting from the fact of their liability to be mistaken for disease of the vertebral column. He thought, however, the symptoms in the first class of cases were more of a typhoid character than they were in the second, and this would assist in our diagnosis.

Mr. ARNOTT remarked, that the case detailed by Mr. Phillips, and those of a similar character, were interesting chiefly from the difficulty which the practitioner experienced in determining the origin of the disease during the lifetime of the patient. He thought that where the abscess depended upon disease in the kidney, it was much more rapid in its progress than when it was the result of disease of the vertebræ.

Mr. PHILLIPS said, that there would still be a difficulty in this mode of diagnosis, from ignorance of the time at which we should commence our observation of the rapidity of the suppurative process. In this case the man had suffered from pain in the loins for two or three years.

Mr. ARNOTT explained, that after the swelling had commenced it was rapid in its progress.

BRITISH MEDICAL ASSOCIATION,

Exeter Hall, June 16, 1840.

DR. WEBSTER in the Chair.

GEORGE FLOCKTON, Esq., Cambridge-terrace, Edgeware-road, and GEORGE ALFRED WALKER, Esq., 101, Drury-lane, were elected Members of the Association.

Dr. Maunsell, of Dublin, communicated the information that Mr. Carmichael, of Dublin, in the most disinterested manner, had placed the handsome sum of £500 at the disposal of the Irish Reform Association, to aid in carrying out the principles with which they had embarked. A noble instance this of a conviction that Medical Reform is become absolutely necessary, and of a pure zeal to have it carried out for the benefit of others, for Mr. Carmichael's standing and circumstances preclude his having here any interest of his own. This manifestation of a pure public spirit demands from the British Medical Association (though otherwise unconnected with it) its best thanks.

A vote of thanks to Mr. Carmichael was then unanimously carried for his contribution to the cause of general Medical Reform.

A letter was read from Alexander S. Moodie, Esq., the Secretary of the Stirling Medical Association, expressive of a desire on the part of that body to advance the cause of Medical Reform, and requesting information respecting the state of this important question. The reply of the Association was also read, the purport of which was, that although the question of Medical Reform had never assumed so promising an aspect as at present, there was great cause for increased energy on the part of its advocates, and to urge the agitation of the question by meetings and by petitions to the Houses of Parliament, especially the Commons.

A letter was read from Dr. Fearnley, of Dewsbury, respecting the operation of the New Poor Law. It stated, that in consequence of the system of contract being adopted by the Poor Law Guardians, and the most miserable pittance being offered as remuneration to the surgeons, a meeting of the practitioners of the district was held, at which it was determined that none of them should offer themselves as candidates on the day of election, after representing the state of the case to the Guardians. The Board viewed the proceedings as an unholy alliance between the medical men of the district, and issued an advertisement making others in neighbouring districts eligible; and, finally, elected a surgeon residing at three miles' distance from the centre of the district. This being double the distance recommended by the medical witnesses on the Committee of the House of Commons, a suggestion which it is understood is about to be adopted by the Poor-Law Commissioners, the proceeding of the Guardians is highly objectionable, and must, obviously, give rise to much neglect of the poor.

A notice was communicated of the Annual General Meeting of the Eastern Medical Association of Scotland, which was held on the 10th of June at the Watt Institution at Dundee, James Chrichton, Esq., the President, and a distinguished surgeon, being in the Chair. The following resolutions were unanimously adopted:—

1. That it is the duty of the State to adopt measures for protecting the health as well as the property of its subjects. Moved by Adam Moon, Esq., Surgeon, Dundee, and seconded by Alexander Ramsay, Esq., Broughty Ferry.

2. That, from the difference in the constitution of the various colleges and corporations at present at the head of medical affairs, the principle of self-election and irresponsibility which pervades most of them, and the want of power in them to protect the legally-qualified practitioners and the public from the pernicious practices of ignorant pretenders to medical and surgical knowledge, legislative interference has become necessary to remedy these abuses. Moved by John Livingstone, Esq., and seconded by George Paton, Esq., Dundee.

3. That unanimity among the members of the profession is highly desirable, as the best means of procuring a reform of the manifold

abuses which at present exist. Moved by W. L. Gibson, Esq., M.D., and seconded by W. Aitkin, Esq., Dundee.

4. As the outlines of a plan of Medical Reform prepared, and circulated by the British Medical Association, contain the fundamental principles on which such a measure should be founded, this meeting generally approves of these outlines. On moving this resolution, Dr. Arrott said, that by the meeting having adopted the previous motions, they had declared that unanimity among the members of the profession is highly desirable, as the best means of procuring a reform of the manifold abuses which at present exist. He hoped they would now act according to that decision, by declaring that the outlines of the plan of Medical Reform proposed by the British Medical Association, which have already been unanimously adopted by that body, consisting of upwards of 1200 members, are those on which such a measure should be founded. Let them strive in the mean time for the general object which included the others, he meant a sound medical constitution. By their united efforts he had no doubt but that an improved state of the profession might be brought about. They must sink all minor differences as the phrase is, if they meant to carry anything at all. The motion was seconded by David Lyell, Esq., Dundee.

It is proper to state, that this Association, besides watching the interests of the medical profession in a political point of view, unites also the attention to scientific objects. After the adoption of these important resolutions, Mr. Thomson read an interesting paper on the cure of distorted limbs by the section of tendons, and exhibited a number of casts of deformed feet, and casts of the same after cure.

A letter was read from Lord Ellenborough, in answer to one forwarded to his lordship by the Association, in reference to his Vaccination Bill introduced by him into the House of Lords.

A letter was also read from Lord John Russell, stating that he would give every attention to the suggestion and plans of the Association, for the better administration of medical relief to the poor.

The following communication was read from Dr. Leet, of Dublin, addressed to Dr. Marshall Hall, as Chairman of the meeting of the Association on 19th May, relative to statements then made by the practitioners of the North of Ireland :—

"Dublin, June 9, 1840.

"Sir :—There is, in The Lancet of May 30th instant, a report of a meeting of the British Medical Association, in the course of which is a statement, made by a deputation from certain physicians and surgeons practising as apothecaries in the North of Ireland, which, if left uncontradicted, is calculated to produce a most unfavourable impression as to the actions and motives of the Apothecaries' Company of Dublin. I therefore, Sir, take the liberty of addressing you as the chairman of that meeting, and of requesting you to lay the following brief reply before the next reunion of your members. I will simply extract, without comment, from the Parliamentary returns, these facts, which answer in full the erroneous charge.

"In the statement it is asserted, 'we have been practising in every branch of the profession (many of us for twenty years and upwards) undisturbed.' 'This Act was not generally enforced till the year 1827, consequently, we were ignorant of its existence, or thought it a dead letter.'

"Parliamentary Return :—'List of all persons prosecuted by order of the Company for malpractices, or for refusing to apply for licence since their establishment to 31st December, 1832.' The return is voluminous; but I select, for example, years up and down through it, in which prosecutions were numerous in Ulster :—

	Prosecuted in all Ireland.	In Ulster.
1792	10	5
1793	19	17
1807	8	4
1824	5	3
1828	60	33
	102	62

"In the statement it is asserted, that the object of the Company is to gratify avarice, and that in two years before it realised £5000.

"Parliamentary 'Return of the total expense incurred by the Company in conducting prosecutions from 1791 to 1834; the total amount recovered from the parties prosecuted; and the balance between the expenses incurred, and the sums recovered :'—

Total amount recovered	£3635 17 11
Total expenses incurred	3019 19 4
Balance	£615 18 7

"The apothecaries of Ireland know how that balance was spent.

"In the statement it is asserted that 'the Company gave their licence to several notoriously ignorant persons on their paying the penalties.' No one ever got a licence without examination, the examinations are public. The only Parliamentary return, on this head, is one entitled, 'Return of persons who paid penalties to the Company, were examined and rejected, for the years 1828-1829 :—

1828 .... 10 fined and rejected.
1829 .... 17 do.

"There might have been from 50 to 60 examined.

"With these assertions, relative to the present and future conduct of the Company (as I would only meet them by counter-assertions), I have nothing to say. Their fertile imaginings, therefore, of 500 being under prosecution, and £10,000 to be realised, I leave unmet, knowing that you, Sir, your influential Association, and the public at large, will set a due value on the statements of individuals who could be so far hurried away, as thus grossly to misrepresent one of the plainest and most accessible of documents—a Parliamentary Return. I have the honour to be, Sir, your obedient servant,

"CHARLES HENRY LEET,
"Secretary to Apothecaries' Hall."

The letter having been submitted by Dr. Hall to Dr. Hurst, the latter gentleman, who was present at the meeting, put in the following reply:—

"Abstract of Parliamentary Return from 'Dublin Apothecaries' Hall.'

"The Act was passed in 1791.

"'From 1791 to 1826, 100 persons *in all Ireland*, in 35 years, or scarcely *three* in each year, were prosecuted and fined; but 18 of these 100 lived in Dublin, so that if the 18 are subtracted from the gross number, it will leave a very little more than *two* in each year for all the rest of Ireland, and in 1826 there were only *two* persons fined.' Proving that their 'Act was not *generally* enforced' up to this time; that it was in reality a dead letter to the people of Ireland for 35 years; whereas from July, 1827, to November, 1828, a period of only *one year* and a quarter, there were prosecuted and fined 137.

"As to *monies received*. In the first 35 years there came into their coffers for fines only £1369 5s 9d, or £39 2s 5¼d in each year; whereas, by their own books, it appears, as stated in this document, that in *one year* and a quarter, viz., from July, 1827, to November, 1828, they realised by fines the enormous sum of £2313 12s.

"Only *seven* of the persons fined in this latter period resided in Dublin, and of course only £140 were raised in that city. The penalty enforced then was £40 from each. Lord Francis Leveson Gower was the person who, when Chief Secretary for Ireland, stopped the proceedings of the Irish Apothecaries' Hall."

It was then moved by Mr. Brady, and seconded by Dr. P. H. Green, and carried unanimously, that a congratulatory address be presented to her Majesty on her recent happy escape from assassination.

The Association then adjourned till Tuesday, 30th June.

PROCEEDINGS OF THE

DUBLIN APOTHECARIES' COMPANY.

To the Editor of THE LANCET.

SIR:—As Dr. Charles Henry Leet, the "Secretary" to the Irish Apothecaries' Hall, has promised, in your Journal of the 13th inst., to "forward" to the British Medical Association "such documentary evidence as will completely demonstrate the incorrectness" of the statements made to the Association by Dr. Marshall and myself, and subsequently published in THE LANCET, I beg, before leaving this city, to supply you with a *correct* and detailed account of the number of persons fined and prosecuted by the Dublin Apothecaries' Company for the first 36 years of their corporate existence, striking the average of each year, and comparing that with the number fined and prosecuted immediately afterwards, or during the next 17 months. I also give you a *correct* account of the "monies received" by them for penalties, during both periods, showing the average for each year, and comparing the two periods, which is a much fairer mode of ascertaining the "correctness" of our previous "statement," than giving, as I suspect Dr. Leet will do, the numbers prosecuted and fined in certain years, leaving the remainder of the years unnoticed. The following accounts I have most carefully made out from the only "Returns" ever furnished to Parliament by the Dublin Apothecaries' Company, or printed by the House of Commons. These "Returns" any one may procure at the office of the Messrs. Hansards, printers to the House of Commons, in Abingdon-street, as I have done, for the small sum of 1s 3d.

One of our "statements" was, that "the Act was not *generally* enforced until the year 1827." See LANCET of May 30th. The "Act" was passed in 1791. From Nov. 1791 till Sept. 1827, only 100 persons in all Ireland in 36 years, or scarcely three in each year, were prosecuted and fined for various offences against the Act, but 18 of these 100 persons, or nearly one-fifth, lived in Dublin, so that if the 18 be subtracted from the 100, it leaves very little more than two in each year for all the rest of Ireland; and in 1826, there were only two persons fined by the Hall; whereas, from October, 1827, till March, 1829 (the date at which the "Returns" close), in *one* year and five months, they prosecuted and fined 135 persons. It thus appears by the "Parliamentary Returns," fairly quoted, that they prosecuted and fined before October, 1827, at the rate of scarcely *three persons in each year*, and after that date, at the rate of 120 *persons in each year*! Were we "incorrect," then, in stating, that the Act was "not *generally* enforced until the year 1827?"

Next, as to "monies received" by the Company for penalties.

During the first 36 years of their existence they procured, by fines, as appears from the "Returns," the comparatively small sum of 1409*l* 5s 9d, or 39*l* 2s 11¼d in each year; whereas, from October, 1827, till March, 1829, there came into their coffers by penalties, in 17 months, the sum of 2274*l*.

There are no "returns" of *costs*; but the "Court of Directors *beg to observe*," that they "have expended, for the recovery of the above sums, *about* 2300*l*." Now, as to this "*observation*" *about* the amount of costs, I beg to observe, that I don't believe a word of it, because it is contrary to well-known facts and to common sense. The facts are, that in every case where they received or recovered the penalties, whether through intimidation or by law, they always got their costs—they enforced the payment of them. There are two cases marked in the "Returns" "paupers." In these, the parties (one of them I know to be a most respectable and well-educated surgeon) having brought the matter to trial, were pauperised by the tedious and ruinous legal proceedings, and availed themselves, with a manly fortitude honourable to them, of the benefit of the "Insolvent Act," and, consequently, the Hall lost fines and all; but with these two exceptions, and a few individuals on whom *capias* was served, and no other proceedings taken, there is no evidence to show that so much money was expended by the Hall to recover these penalties. The usual course was, if a letter of intimidation failed to extort the fine at once, immediately to serve a *capias*, and if this were resisted in the Court of King's Bench, to file a declaration; but the prosecuted party, led thus far by an attorney, generally obtaining at this time an unfavourable opinion from counsel, submitted, and of course the payment of all costs was enforced. Indeed, it were unreasonable to suppose that it could be otherwise. How, then, was the large sum of 2300*l* expended?

The number of physicians and surgeons ("500") in the North of Ireland alone, liable to be prosecuted by the Hall at the present time, and the sum of money ("20,000*l*") to be realised by their prosecution, were both *under*-stated by us; if we had nearly doubled them, we should have been, perhaps, nearer the truth, but we wished to keep within the limits of strict certainty. My excellent friend, Dr. Atkinson, of Drogheda, informs me that it was not Lord Stanley who "arrested" them in their former illegal and tyrannical proceedings, but Lord Francis Leveson Gower, when Chief Secretary for Ireland; we were aware of the certainty and correctness of the fact, but had mistaken the man; in other respects our "statement" was strictly and literally correct. It was a simple, concise, narrative of astounding facts, without comment, and produced a corresponding impression in Parliament and out of it.

These facts and figures, however, are, after all, beside the question: the main question is—what right have they to prosecute legally-qualified and highly-educated medical practitioners, whilst they permit ignorant and unqualified empirics to practise pharmacy with impunity? The comparative poverty of the latter may account for their escape; but I have before me a copy of the "Belfast News-Letter" of June 12th, in which Dr. Leet has the audacity to style us "ignorant pretenders to pharmaceutical knowledge." Now, though this will meet with a suitable and, I hope, dignified reply, I ask, is it honourable—is it professional, to attempt to gull the non-medical public in this way, whilst Dr. Leet knows he dared not to hazard even an insinuation as to incompetency in the pages of a *medical* journal?

But, Sir, the Dublin Apothecaries' Company have agreed to "stay all proceedings for the present," on condition that we "suspend all operations by Bill in Parliament;" which, if it had been introduced, would inevitably have led to their utter extinction; and as the truce has been accepted on our part, it would perhaps be ungracious now further to refer to them, or their shameful prosecutions, than merely to hint, that they will show themselves to be "wise in their generation," if they never again resume them. I shall, however, have occasion to revert to certain other parties, whose conduct, in this very painful affair, has been most ungenerous and reprehensible. With grateful feelings towards you, Sir, I am your much obliged and obedient servant,

CHARLES HURST, M.D., Surgeon, &c.

London, June 22, 1840.

SIR:—It will give your numerous readers some idea of the just indignation that the prosecutions directed against highly-qualified and respectable medical practitioners in the North of Ireland, by the Dublin Apothecaries' Company, have excited in the public mind there, and of the sympathy that exists on behalf of the sufferers, when I inform them, that great numbers of non-medical petitions have been forwarded to Parliament, praying for protection to them, and signed by justices of the peace, landed proprietors, clergymen of all denominations, solicitors, seneschals, merchants, &c. &c. The petition from "Larne," in the county of Antrim, a town not containing more than 4000 inhabitants, is signed by *four* magistrates, *twelve* clergymen, *three* attorneys, besides merchants and other respectable inhabitants of the place; and, on this evening, Sir William Somerville, M.P., will present to the House of Commons a general petition of this kind from Drogheda, measuring in length *twenty-*

three feet, nine inches, and being, in fact, "the largest and most respectably-signed petition that was ever sent to Parliament from that town on any subject."

I beg to subjoin a copy of one of these petitions, which you are at liberty to publish, if you think it proper to do so. As the names are too numerous for publication, I have not given them. I am, Sir, your most obedient servant,

CHARLES HURST, M.D., &c.

London, June 22, 1840.

"To the Honourable the Knights, Citizens, and Burgesses of the United Kingdom of Great Britain and Ireland, in Parliament assembled:

"The memorial of the magistrates, clergymen, and other inhabitants of the town of *Lisburn*, in the county of Antrim, showeth:

"That they have learned that a company, called the 'Irish Apothecaries' Company,' have commenced legal proceedings against many well-qualified medical practitioners in the North of Ireland:

"That these proceedings are intended to be general, should the Company succeed in those actions at law already commenced against some most deserving members of the medical profession:

"That memorialists have had every reason to be satisfied with the manner in which that part of their professional business, relating to the compounding and dispensing of medicines, has been conducted; that many of these physicians and surgeons have resided in this town for years, and have hitherto been allowed to follow their professional pursuits undisturbed:

"Memorialists would, therefore, pray your honourable House, that these gentlemen may be permitted to give their professional services to memorialists and the public, as heretofore; and that your honourable House would pass an Act, at an early period, for retaining and securing to them those rights and privileges, conferred on them by the different universities and colleges, from which they hold their degrees in medicine, and diplomas in surgery and pharmacy.

"And memorialists, as in duty bound, will ever pray."

VACCINATION.—APATHY OF THE POOR.

THE experience of a Poor-Law Union Surgeon on small-pox and vaccination amongst the poor, is described in the following extract from the letter of a gentleman whose name and address are attached below. Mr. Smith has a district of eight villages under his charge:—

"The poor are very indifferent to medical relief in all diseases which have a *determinate course*. Small-pox prevailed extensively in the village of Ruddington in the winter and spring of 1839. I have seen no fatal cases of that disease where vaccination had been practised, but several of a mild character, all terminating in recovery. The neglect of vaccination is extreme; while all the rich and middle classes attend to it, I do not believe that five per cent. of the poor secure this benefit. The neglect does not arise from prejudice, or dislike, but from the complete apathy and carelessness. The *time of the poor is so occupied in procuring a bare subsistence, that they do not provide or guard against contingencies*, and it is only when their children are dying, daily, that they seek the protection of this invaluable blessing. When an epidemic occurs they flock to some non-professional person, who, with his needle, punctures them by the dozen; and thus, in this irregular manner, from the want of a better, vaccination is performed among the poor. Although I give it out that I will vaccinate gratuitously, I have not an applicant above once a year. It should be made the interest of surgeons in the country to vaccinate. It should be arranged for the surgeon to visit the poor at their own houses, vaccinate all he can, and receive a bonus for every case of cow-pox he can produce to the guardian of each village, who may countersign an order from the overseer or relieving officer, stating the perfect or the imperfect result; of course guarding against those being paid for, who are able to pay for themselves.

"J. SMITH."

Ruddington, Notts., May 14, 1840.

*** Happy England, the glory of the world, whose poor have no time from toil to think of health!

RE-VACCINATION

IN THE DISTRICT OF VILLENGEN.

OF 123 re-vaccinations performed at Villengen in 1838, upon persons between the ages of 11 and 20 years, the results would go to prove that the operation was successful in the proportion of two-fifths of the whole. On the other hand, the epidemics of variola would show that, in general, persons who had been vaccinated and had arrived at the age of 20 years, are but slightly affected when attacked by small-pox; but in proportion as they grow older the small-pox becomes more serious. In old persons, although previously vaccinated, the disease is as violent as in those who have never been vaccinated at all.

In the epidemic of Villengen in 1837-38, none who had been vaccinated took either the variola or varioloid, although several persons were vaccinated in the very houses in which the small-pox raged. This operation is very trifling, and never attended with any serious consequences.—*Gazette Medicale*, April 18.

THE LANCET.

London, Saturday, June 27, 1840.

On Tuesday last, Mr. WARBURTON, M.P., placed on the list of notices of motions in the House of Commons, the announcement, that on Tuesday, the 7th of July next, he would move "That this House do resolve "itself into a Committee of the whole House "on the Acts affecting the Medical Profes- "sion."

Up to the 10th of this month (June) there had been presented to the House of Commons during the present Session of Parliament, in favour of changes in our medical laws, sent from medical practitioners residing in various parts of the kingdom, 89 petitions, containing 1555 signatures (some of them being signed by the Presidents of Associations on behalf of the whole body). The additions since that date cannot at present be enumerated. Of the above number, more than five-sixths of the petitioners expressly pray for the institution of a REPRESENTATIVE NATIONAL FACULTY OF MEDICINE, according to the views which have been advocated in this Journal. Not one petition adverse to this prayer, or against Medical Reform to any extent whatever, has been presented to the House.

THE grumblers form a large class in the community (we say this, approving of discontent under grievances), but the *remedialists* are few. There are twenty thousand objectors, and more, to one man who has at hand an efficient cure. Not only are sound reparations for notorious evils scarce, but even *unfit* applications for calamities are seldom projected, so much easier is it to decry than to invent. In slight affairs, especially in personal grievances,—the absence of a scheme of reform,—often amounts to proof that no change is needed, and that the mountainous complaint either is a magnified mole-hill, or betrays an imperfect view of the thing condemned; or the grumbling party is ignorant that even the "bad" is the *best* that can be had, and must be suffered, from poverty of invention. Thus it might happen that no streams but those of the Thames and the New River could be laid under contribution for a supply of water to this thirsty metropolis, and that we *must* be content therewith. But the evidence which has recently been given before the House of Lords, partly analysed in the last LANCET, tends to establish a more welcome fact, and, as a matter of great sanatory interest, we pursue the proofs in the pages of this Journal, whose readers belong to that class amongst whom Sir HENRY HALFORD promised, a long time since, to excite such an interest on behalf of Mr. PATEN'S scheme, that "nothing should stop it." In addition to the general testimony against the purity of the present supply, the following was furnished to the Committee of the Lords:—

March 11, 1840.—RICHARD PHILLIPS, *Esq., examined, the Marquess of* WESTMINSTER *in the Chair:*

You are a chemist?—I am.

You went on Saturday last to Bushey Mills?—I was there collecting different specimens of water. I have analysed them. The engineer, Mr. Giles, went with me, to point out the places where I should take them.

Of what nature did you find the water?—I will first take the main spring at Bushey Lodge. I operated on a quart, and that yielded, for a gallon, by evaporation, as nearly as I could tell, for time has not allowed me to be very nice, nor is it requisite, seventeen grains of carbonate of lime, and of sulphate of lime and common salt five grains and four-tenths. There was no metallic impregnation, nor any manganese; but it contained a little vegetable matter.

What proportion?—I cannot tell; the quantity was very small. It would take a very large quantity of water to determine that at any time. The next I tried was described to me as the water of the spring just above where it joins the Colne. I then tried water from the Colne itself. (The result was nearly the same.) There also was water brought to me by a messenger from the Woods and Forests, which was, I understood, from the West Middlesex Water-works. A gallon gave of carbonate of lime, as nearly as I could judge, fifteen grains, and of sulphate of lime and common salt, five grains and four-tenths. There was

a little vegetable and some animal matter, but no metallic impregnation. How much of animal impregnation it is impossible to tell; the time I had to make the experiments was so very short; but still there was some. I do not know whether it will be proper for me to state, respecting the use of pipes, that spring water in going through lead-service pipes is more apt to dissolve the lead than water which has long been exposed in a current. I take the liberty of directing attention to that circumstance. Trials should be made as to whether this water from the Colne produces any different or worse effects on lead than Thames water. I do not apprehend it will, but I think that circumstance worth notice.

Your attention has been called to that by the office of Woods?—Yes, more particularly, lately, in a case in the country where parties have suffered very greatly from spring water coming through lead pipes; but I do not apprehend any thing from this (the Colne water), for the water is not sufficiently pure (for the purer the water the more mischief it does) to do mischief.

Is the water from these springs soft?—About the same as Thames water; I should call it soft.

By your analysis it would appear that the West Middlesex water is purer than the water you went to try?—It contains less saline matter.

And less deposit?—It yields more deposit, I have no doubt; and has also, which I apprehend the Colne water has not, animal matter dissolved in it, I believe.

Which water do you prefer?—If I were a water-drinker, I should certainly prefer the water from the Colne; let the other be ever so clear, there is always animal matter in solution.

Does your observation apply to water taken from *any part* of the Thames?—I should think it would apply very little above Teddington.

What is your opinion of filtration?—I think it will get rid of all the mechanical impurities, but not of any thing which is dissolved; it will not make a hard water soft, nor get rid of animal matter dissolved in it.

Would it make soft water hard?—Certainly not, performed properly.

The water at Bushey Mills you found very pure?—I think it exceedingly good.

Is it the sulphate of lime that makes water soft?—No; sulphate and carbonate of lime make it hard.

For all purposes, which should you prefer, water from the Thames *above Teddington*, or water from the Colne?—I do not think there would be much difference; I had rather make sure, and take it from the Colne, if I were to *drink* it. The Thames above Teddington appears rather the softer, but very little.

Would a sufficient supply from Bushey Meadow be a great advantage to the metropolis?—I think it would; because the water, though sometimes turbid as it runs, is generally clear; and that turbidness, when it does happen, would only arise from mechanical impurity. The material difference between the two is in the animal matter.

Is the Thames water more or less impregnated by the refuse of gas-works?—It would be very difficult to prove that, except at certain places; I could not undertake to do it.

March 16.—*Mr.* WILLIAM MAUGHAM *examined:*

What are you?—A chemist.

Have you analysed the water at Bushey Meadows?—I was analysing it just now when sent for.

State what it produced?—It is very pure; it contains carbonic acid gas in such a quantity, as to render it as highly sparkling as spring water drawn from a pump. It holds in solution carbonate of lime and common salt; and that is all it contains.

March 30.—*Mr.* PHILLIPS *further examined:*

Have you analysed the Thames water since you were here last?—I have analysed six different kinds, namely, water taken from the river in three different places, and water sent from the water-works opposite those three places. The first I took was the Grand Junction supply near Brentford, where the pipes are; the other two were the West Middlesex and the Chelsea.

State the result of your examination of the water from the Grand Junction?—A gallon gave nineteen grains of residue; that is, of carbonate, sulphate of lime, and common salt. There is one circumstance particularly to be attended to, and that is the degree of mechanical impurity separable by the filter. I filtered it, and nineteen pints gave me only seven-tenths of a grain; that is, the whole of the impurity from nineteen pints.

[The remainder of this portion of Mr. Phillips's evidence (on the three waters of the Thames) tended to show somewhat similar results as regards the effects of filtration on them. In the whole of this evidence we have supplied an abstract of the chief facts, in place of printing with them superfluous questions.]

Now the Bushey water. Say something more upon that?—The mechanical impurity, separated from it by filtration, amounted to one-third of a grain from eighteen pints, composed of vegetable matter, fibres chiefly.

What would be the result of the analysis at London, after taking it sixteen miles?—It would very probably contain less carbonate of lime, in consequence of its giving out carbonic acid during its passage; but so small in quantity as not to be worth taking into account.

The necessity for a change being established, what rank among the projects that have been broached, should the present scheme take? From causes which may be guessed, but are not made apparent in this "Report,"—for the evidence relates solely to the Bushey Springs Water, and complaints raised against the existing Water Companies,—all other proposals are abated. They may, probably, therefore, be classed as inadequate to the purpose desired. But what are the features of Mr. PATEN's scheme which claim for it support?

It is proposed to excavate a capacious reservoir eighteen feet deep in Bushey-Lodge Meadow, 12¼ miles to the North of London. At that depth (ascertained by boring) there is a very considerable bed of spring water, arising from numerous springs. From the river springs in this meadow, taken with borings in it for still deeper water, the reservoir is to be charged. Mr. GILES, the well-known civil engineer, and engineer to the proposed Company, would add to the supply, water from the springs that partly feed the Colne River. Mr. PATEN says, that the latter is unnecessary. Mr. GILES also recommends that, instead of *new means* of distributing this water in London, the existing Water-work Companies be furnished with the water at a rental, that the buildings, mains, and pipes of those Companies may suffice, and thus the breaking up the streets to lay new "services" for a fresh Company be avoided:—

Questions put to Mr. GILES.

Would the present means of supply be entirely given up by those companies you refer to?—That is my proposition; I recommend that the Colne waters should be conducted to St. John's Wood, London, where it would be at the height of 160 feet from Trinity high-water mark, and from that reservoir it would descend, by its own gravity to the high and low services, through the companies' own mains, carried to St. John's Wood.

A great deal of capital is now invested in the mains which the existing companies have laid down?—I do not intend at all to interfere with the retail supply under the present companies, but to produce a main supply of water for their use, which those companies should pay for; and I am inclined to think that the expense they now incur in pumping the water from the Thames, and in filtration and annual expenses of that sort, would go very far to pay the annual interest of this expenditure.

What is your estimate for bringing the water?—For the works, nearly £500,000, which, together with compensation to the mills that would be deprived of the Colne stream, would be £600,000. No machinery is required.

You would oblige the companies to take it from you; you would not leave it optional with them to take it from you, or from the Thames, as they now do?—Parliament must regulate that; it should be made compulsory, if it be better water.

You have spoken of their saving the expense of filtration; the New River Company do not filter, do they?—No. The water from the New River the private houses filter themselves, and then it is very good water; but the other companies filter. The water of the New River is contaminated by the drainage of lands into it. As to the present companies, in addition to the desirableness of preserving their property, it is always inconvenient to disturb the town by laying down new works of this sort; and so much has been done by water and gas companies, and in making sewers, that this is matter deserving much consideration. We should, therefore, if possible, get them to use this water.

Then you do not object to the present monopoly?—No; but I have had no communication with the present companies.

The companies have at present the supply of London in their hands; there is no competition?—No; and to break up the monopoly would take such a range of capital that I have not directed my attention to it.

Within any given time would your company, formed or not formed, make the additional experiments that are necessary to establish their views?—I cannot answer that question. The party have been very sanguine in supposing that a Bill would pass this year, and that they were to go to work directly. My plan will be, for the present, merely to lay the matter before the public, and to acquire information to enable a company to come to Parliament next year.

Mr. GILES mentioned another agreeable and welcome result of the new supply of water, and a hint for obtaining the aid of the Messrs. MATHEW, of London. He said—

At a meeting held the other day on this matter, one of the gentlemen suggested that, in the event of this water being supplied, it would also supply fountains, distributed over the town, for the use of strangers about the streets, who cannot at present get access

to water; that it would be very grateful to persons traversing London in the summer, who are driven into public-houses from the want of water to drink.

Mr. GILES is fearful that the supply from the meadow-springs alone would be insufficient. But Mr. PATEN, who has given more attention to the subject, and who is more enthusiastic in the matter, speaks with the utmost confidence of his own plan, as developed in the following abstract of his evidence. He, also, it will be seen, differs from his coadjutor (Mr. GILES), as to the propriety of a connection with the existing companies. He may have had more convincing proof of the mischief of maintaining what their Lordships, in a remarkable fit of candour, called a "monopoly." When brought to our doors, how readily we can perceive an evil that is passed unheeded when only knocking at our neighbours. Legislators buy water as well as wine; and judging from the ready manner in which the words "monopoly" and "competition" came from the lips of the querist, we imagine that noble Lords have no sympathy with companies that can demand for water any price, and supply it, with impunity, of any quality but one.

Mr. ROBERT PATEN *examined*, *March* 24.

You are the engineer of the water company which has been in agitation?—It was arranged that I should carry out the works, as the projector of the scheme.

You have been some years endeavouring to supply London by Artesian Wells sunk in the vicinity?—I have; but the plan by which I am now prepared to supply London is to raise the water at a distance, which obviates the prejudice of many people, respecting the drying up of private individual's wells. I have no doubt in the world but that London could be supplied by those springs which now run over in such copious quantities in Bushey Valley. Without having recourse to Artesian borings, there is a sufficiency of water there to supply a million and three quarters of people, giving each individual seven gallons per day, or sufficient to supply the whole of the North side of London, taking the population at 1,250,000, giving them ten gallons per day each. These springs are not supplied from land water; for the most copious rains never augment their quantity, and the greatest drought never diminishes it. These waters receive their supply from the lower springs, which find their way through the fissures of the chalk. There is a body of water lying eight feet deep under that valley of three miles and a half in length, by about three quarters of a mile in breadth; and it rises within 18 inches of the surface.

Mr. PATEN then details his experiments in support of these opinions. Islington he does not expect to supply from this source, as it is placed too high; nor Fulham. He combats, also, the statement that the mills on the Colne might be droughted by this diversion of water to London. His town reservoir is that mentioned by Mr. GILES, erected near the Eyre Arms Tavern, having, to that point, a fall of 140 feet from Bushey Meadows, and then 13 feet more to the highest point of service in London, no machinery being necessary for raising or forcing it any where, and the culvert being five feet in diameter for the passage of the water to London, the first portion being tunneled for six miles underground, then running above ground, partly on an aqueduct; then occupying two miles more of tunneling, the residue consisting of an iron main. His estimate of the cost of this is about £400,000; and less than £100,000 for the laying down main and service pipes in such a parish as that of St. Marylebone.* This expenditure would, he calculates, be remunerated by an interest of £10 per cent. from that parish for instance, which he presumes would willingly pay £50,000 a year for the water, considering that it now pays a water-rental of £55,000 per annum for foul water. He sums up the advantages thus:—

Consequently this water can be brought to London, to pay ten per cent. for the outlay of capital, and save to one parish alone £5000, in addition; and then the greatest blessing that can be brought to London is obtained,—an abundance of the purest water, sufficient to supply the whole of it, for nothing. From my experiments I am quite convinced that this water can be given to the inhabitants of London at a very cheap

* "It would cost for the main and service pipes for Marylebone about £86,000, and that contains 12,700 houses. I have the length of every street, and the size and price of every pipe, that I made five years ago."—*Mr. Paten.*

rate. It can be appropriated to the supply of private and public baths. You may have fountains of this pure crystal stream all over London, and the mains always full, in case of fire; and your Lordships will consider this a strong argument in support of my plan, for there is greater destruction of property in London through not having a supply of water, or the facility of obtaining it when there is a supply, even after the arrival of the engines, than would pay for the expense of bringing this water to London.

Are the Company you have mentioned waiting to hear what the Report of the Committee of the House of Lords is?—Anxiously waiting.

Every shield has two sides, which the knights who reached a certain notable statue by opposite roads, discovered, to their respective misfortunes, at a late hour of their equally notable combat. Having presented to our readers the golden side of Messrs. Paten and Giles's shield, we present the obverse, in a few lines taken from the Appendix to this volume of "Evidence," which contains documents drawn up at the offices of the New River, West Middlesex, and Grand Junction Water-works' Companies, contending that, since the public alarm respecting their supply of water to London was excited in 1827, great improvements in it have been effected, and they have some improvements farther in contemplation. The writer for the Grand Junction Company then adds:—

The experiments made by Dr. Bostock, given in evidence before the House of Commons in 1834, and the further experiments made by that gentleman at the desire of your Lordships' House in 1835, establish beyond a doubt that the water of the Thames, when freed from matters mechanically suspended, is equal if not superior in purity, as far as saline ingredients are concerned, to all other waters, while it is beyond a doubt better fitted for general domestic purposes. The certainty of delivering water free from extraneous matter at all seasons of the year can only (as the company are disposed from a long experience to believe) be effectually secured by filtration. Works for this purpose, accordingly, they are about to construct, in addition to what they have already accomplished. When the whole plan is completed, they are satisfied that their supply of water, both as regards purity and abundance, will be unsurpassed by the supply given to any city in the world, and such as they do not believe capable of improvement. For these improvements they have not made the smallest addition to their rates (We should hope not, indeed!)

Under these circumstances they respectfully trust that your Lordships will not countenance schemes the execution of which must involve large outlays of capital for the purpose of discharging functions already adequately fulfilled; schemes which would therefore occasion a waste of capital, which in the first instance would be seriously injurious to the existing companies, but which would ultimately, beyond all doubt, fall heavily on the public.

Every metropolitan householder, however, who looks at the bottom of his cistern, or his water-jug, after reading this, will still pray for crystal water from the grateful springs with the pastoral name.

GEOLOGICAL IMPOSITION.

The following announcement is going the round of the newspapers:—

"ANTEDILUVIAN HUMAN FOSSIL.

"A discovery of the most interesting nature, which has recently been made in Belgium, at this moment invites the inspection of the scientific and the curious at No. 18, Leicester-square. It has been distinctly laid down by Cuvier, and received as an axiom in geology, that the bones of the inferior animals alone were to be found in the fossil state, and that those of man are invariably wanting; a theory whose tendency militated against the Mosaic account of the creation. In the science of geology, there is consequently no problem whose solution offers greater interest than that which depends on the existence or absence of the human antediluvian fossil.

"This question has now, to all appearance, been set at rest, by the discovery lately made of the fossil remains of a child, which were found embedded in *silex*, in a chalk quarry at Diebgen, near Brussels.

"'We have examined,' says the *Morning Herald*, 'this *unique* relic of "the world before the flood," and have no hesitation *in pronouncing it genuine*, in so far as it relates to the specimen itself; but on its positive antiquity we do not venture an opinion, leaving that, which is the most material point, to be decided by the most competent to declare it—the professed geologists. We understand that the proprietor of the fossil has requested the attendance of the Marquess of Northampton, and several members of the Geological Society, to inspect and test it with the most minute scrutiny: the result of this inspection *must be decisive of its claims to antediluvian origin*. The appearance

which it presents is that of the head and trunk of an infant, completely formed, but apparently much compressed. The head is perfect; the nape of the neck, the articulations of the vertebræ, the bones of the throat, the chest, shoulders, and parts of the arms, equally so, and the ribs are distinctly visible. The right arm is broken short off by the shoulder; the left, which is unmutilated, adheres to the side, and is sunk into it. The lower extremities are indistinct, being thrown up into a circular mass below the abdomen. From a section of the lower part, which was accidently made in its discovery, the formation of flint, in which it was preserved, is at once apparent, and on its surface portions of the bones are clearly to be traced. It is altogether *a most curious and attractive exhibition*, and would, we doubt not, be visited by numbers, had not the proprietor fixed the rate of admission so unusually high. This circumstance, however, may not deter the *scientific* portion of the public, especially when it becomes generally known that the opportunity for examining this *wreck of a world destroyed* is limited to a few days'."

One scarcely knows which to admire the most, the impudence of the owner of the "thing," or the credulity and ignorance of the reporters who have written, or the newspapers which have admitted this and other such criticisms into their columns. We beg to assure our readers that there are not the slightest grounds for assuming that the specimen is *any fossil at all*; it is a mere mass of flint, without *a bone* or a *particle* of bone of any kind embedded therein. It might as well be called a fossil unicorn, as a fossil child. On first reading the announcement advertising its arrival for exhibition in London, we certainly did suppose that the stone contained some bones, or other organic remains; and that the description of it as a human relic resulted from mere ignorance of its character; but we repeat, that this "wreck of a world destroyed" is not a fossil at all. So much for the marvellous relic that was to upset all the theories of geologists! We think it necessary to insert this notice, that our readers may not be tempted to throw away their time and money on this "most curious and attractive exhibition."

Almost all flint nodules contain traces of zoophytes allied to the alcyonia and other animals of that class, and the protuberances and markings on this "human fossil," which have been described (perhaps, originally, through ignorance) as being those of vertebræ and ribs, are only such as are natural to the substance in which they are, on this occasion, found.

STATE OF HEALTH IN THE RIFLE BRIGADE.

To the Editor of THE LANCET.

SIR:—Having observed in a late Number of THE LANCET a paragraph copied from a Windsor paper, representing the existence of an epidemic among the soldiers of the second battalion Rifle Brigade, I beg leave to acquaint you that the statements therein made have no other foundation than much exaggerated public report. It is true, that several cases of phthisis pulmonalis terminated fatally during the past winter, and two or three men have been since carried off by chronic disease, but nothing deserving the name of an epidemic has prevailed in the corps; and, at present, although the sick list is numerically considerable (41), yet the nature of the acute diseases is by no means serious, or likely to terminate unfavourably. May I, therefore, beg you will take an early opportunity of contradicting the paragraph alluded to, and oblige your obedient humble servant,

M. WHITE, Surgeon,
2nd Batt. Rifle Brigade.

Windsor, June 21, 1840.

DAPHNE MEZEREON.

To the Editor of THE LANCET.

SIR:—I am deeply sensible of the advantages which result from the correction of the errors which the most attentive writers must occasionally commit, and I am grateful to any one who may point out to me any inaccuracies which may have occurred in observations made by me. It is, however, necessary, that the somewhat invidious task should be undertaken by accurate and cautious persons, fully competent to give correct information.

Mr. Houlton has, in a letter published in THE LANCET for June the 13th, drawn attention to a remark made by me, in a recent volume of the Royal Medico-Botanical Society's Transactions, which he considers "calculated to lead the student in materia medica into error." Upon a comparison, however, of his own observations with those which I have made, I think that he is much more likely to prove the false guide. I cannot acknowledge that "the information he has given is a public benefit," because I consider what he denominates "obvious truths, which he is surprised should, at this day, be required to be stated in a periodical medical publication," are loose and erroneous statements, at variance with the knowledge and the experience of both the writers and the practitioners of the day.

In the paper to which allusion has been made, I have stated, that it would be advantageous to find substitutes for some of the

vegetables now imported into this country. Amongst others, I have mentioned Daphne Mezereon. Mr. Houlton boldly asserts, that the shrub is indigenous, and that if it were not so, the sensible properties and the medicinal virtues of the Daphne Laureola have long been considered to be nearly, if not quite, equal to its congeners. Neither of these statements can be admitted as "obvious truths." If Mr. Houlton will examine his authorities, he will find, that, until within a very short period, all the Daphne Mezereon medicinally employed in this country was imported from Germany; the latest edition of the "London Dispensatory" contains the words, "It is imported chiefly from Germany," and, although an English drug, has found its way into use under that name; it is seldom to be compared with the foreign article.

The shrub is rarely found native in this country; the words, "very rare," are attached to it by Lindley. The following extract from the "Botanical Herbal" shows that all botanists are not quite so satisfied as is Mr. Houlton, that it is indigenous:—"Mr. Miller is the first who declared it to be a native of this island, namely, near Andover, in Hampshire; since that it has been found in Lichfield, in Suffolk, in Selbornhanger, Hants, and frequently observed in the woods of Buckinghamshire. As it has escaped all our old herbarists, and even the indefatigable Ray and his immediate successors, and as birds are remarkably fond of the berries, there is reason to suspect that they may have disseminated this beautiful shrub, unless we can suppose that it remained unnoticed on account of its flowering before the time at which the herbarists sally upon their vernal excursions." Gerarde informs us, "that he had plenty thereof" for his garden from Elbing, in Poland, he calls it *German olive spurge*.

That Daphne Mezereon and Laureola differ materially in their medicinal properties, is acknowledged by all those who have tried them. Of the four species introduced into practice, all differ in their agency; the two most distinct from each other are the two that Mr. Houlton has mentioned as approximating,—the one is highly energetic, the other is comparatively feeble.

It was for some time suspected that these species were substituted for each other, and Mr. Houlton repeats the assertion. Murray, of Gottingen, when speaking of Mezereon, expressly says, "Qui in Germanorum officinis prostat, nisi foris missus fuerit, huic frutici originem suam debet;" and there is no reason, upon examining the article, as furnished by some of the first houses in London, to believe that the Laureola is sold for the Mezereon. So far from it being a fact that "the medicinal virtues of the two have long been considered to be nearly equal," the same great authority I have quoted, Murray, describes at considerable length the powers of the three species, and scarcely notices the fourth, the Laureola. He dwells upon the innumerable experiments which demonstrate the remarkable efficacy of Mezereon, and points how undefined are the powers of the Laureola. I have the honour to be, Sir, your obedient servant,

GEORGE G. SIGMOND, M.D.

MEDICAL HAND-BILL.—A correspondent at Derby writes as follows:—"Being on a visit, lately, in the neighbourhood of Belper, the accompanying hand-bill was given to me, as having been freely circulated by its author, who was in general practice two or three years since at Sutton-in-Ashfield, Nottingham, but since then has taken a degree in Scotland. Where members, of what *has been* a dignified profession, act thus, we cannot be surprised that the public acquire a taste for empiricism. We should say less about quackery out of the profession, whilst there is so much more in it. Talk of petitioning the Legislature to put down quackery! Pshaw! Can the Legislature compel medical men themselves to act honourably to the public? It is positively rare, now, for a man, by fair practices, to acquire the confidence of the public; for without quackery he is at once set down, either as a dull fellow, or an ignorant one. This is not the natural taste of the public, but has been acquired through the conduct of medical men. Whilst writing this I am reminded of a pamphlet, entitled "Practical Observations on Blindness from Cataract," lately published by Mr. J. N. Thompson, of Nottingham, and which was put into my hands two or three days since. It savours strongly of that of which I complain in the profession. That it was intended for 'the public' no person can doubt, for it would be insulting to medical men, to suppose that it was written for their information. First, it is embellished with a frontispiece, evidently taken from Mr. Morgan's excellent work; and, in addition, favours the public with a full view of the knife and needle; and, secondly, the matter is so miserably meagre, even for the public. The style, if style it can be called, is so bad, and the punctuation, if possible, so wretched, that I am surprised that any man should have expected, that such an abortion could have helped to puff his reputation. Such unprofessional acts should be exposed to professional reprobation. Your very obedient servant,

"A HATER OF HUMBUG."

*** The hand-bill is headed DR. COOPER'S FAMILY SICK CLUB, "established at his residence in Belper, for the benefit of poor working people," &c., with a list of "payments," from 4d per quarter up to 2s 6d—a melancholy exhibition.

UNION MEDICAL OFFICERS.—A correspondent at Presteign, Radnorshire, says, that within fifteen miles of that town there are three practitioners attending medically on the poor of Unions, who have neither of them obtained the licence of the Apothecaries' Company, their appointments by the guardians being confirmed by the Commissioners at Somerset-house. In another instance he states, that "an old man, a very old man, has held the appointment of medical officer to the Union, since the formation of the Union three years ago, an old army surgeon, a member of the college, but in practice prior to 1815. His infirmities having incapacitated him from performing the duties of the office, he has always had a deputy of his own appointing, also an old man, who for some years has practised as a chemist, a druggist, and a cow and horse doctor in Presteign, without medical education or legal qualifications—the one the ostensible, the other the actual attendant on the poor." Our correspondent wishes to know in what respect either of the governing medical institutions of the realm protects, or attempts to protect, the rights of the profession, or the public health.

INOCULATION IN THE NEW FOREST.—A magistrate of Hampshire informs us that a quack named Dolling (WILLIAM DOLLING), residing at Beaulieu in the New Forest, has inoculated fifty children with small-pox, in and near the village of Hythe, within the ten days preceding June 18th, besides many children residing in other neighbourhoods, many of whom, our correspondent says, are those of shop-keepers and publicans, who, having open houses, suffer the infants to run about, and come into contact, unreservedly, with healthy persons. Dolling, he adds, seems to be aware that the law is likely soon to affect his interests, by rendering inoculation penal, and he is, therefore, making all the money he can, ere the law is in operation, although the season of the year is most unfavourable for the disease. Dolling and his wife, he adds, have been extensive inoculators for more than 35 years. There can be no remedy for the present evil until the new law is in force, but we publish this notice, in order that local attention may be more sharply directed to the man, as soon as he can be subjected to punishment for the continuation of his mischievous practice.

BOOKS RECEIVED.

Practical Remarks upon the Causes, Nature, and Treatment of Deformities of the Spine, Chest, and Limbs, Muscular Contractions, and Stiff Joints. With Illustrative Plates and Cases. By Joseph Amesbury, Surgeon, &c. Longman and Co. 4to, pp. 192. Plates 35.

TO CORRESPONDENTS.

Dr. Henry Drummond, of Ipswich, informs us, that he is engaged in a translation of M. Ricord's Maladies Vénériennes, and that it will soon be ready for publication.

Mr. Llewelyn.—The inquest is the only remedy for the neglect or ill-treatment of women dying in childbed. The coroner ought to institute an inquiry into all cases of death in childbed, which have been attended by uneducated accoucheurs, and often into some others.

O. Φ.—The practice of publishing "Prize Essays," obviously to catch patients, is not creditable, but the act itself cannot be condemned on the score of the motive, or the best achievement in medical science might become censurable on the same allegation. In the case of mere compilation or glaring theft, the best punishment would be an honest review in some local newspaper.

Phrenitis, Hypochondriasis, and Co., have forwarded to us a petition, addressed to certain fashionable doctors who allow their footmen to make an alarming use of the knockers of houses in various parts of London, where the memorialists reside, announcing their arrival, not after the manner of grave and reflecting men, whose mission it is to allay suffering and excitability, but with the parade of inflated women of ton, whose motive is vanity, and whose cell is a bore. The remedy lies with the patients, whose servants should be directed to tell the footmen of these Doctors Dulcamara to make less noise on the next occasion. Or the knocker should be tied, at the doctor's hour of visit, and the footman reduced to the indignity of the bell.

The "Wellon Hospital" affair, and the practice of the self-appointed medical officer, are not unique. Every town and almost every village in England contains similar establishments and similar advertisers. In London they abound in every variety of scale. The letter of our correspondent does not contain evidence that Mr. W. is practising *illegally*.

Our notice, derived from a report in the "Dublin Medical Press," of the First Anniversary Meeting of the Great Medical Association of Ireland, recently held in Dublin, is unavoidably postponed for another week. In the mean time our Irish readers in this country will be glad to know that they may obtain copies of the "Dublin Medical Press" (No. 74) from Mr. Churchill, bookseller, 16, Princes-street, Soho.

Communications have been received from *Mr. Bullen, A Friend to Investigation, Mr. Moore, Mr. Field, Dr. Fosbroke, Mr. Coward, An Old Man-of-War's Man.*

Mr. Darcy's communication shall be attended to at our earliest leisure.

Mr. Thompson's case with the preparation has been received.